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DYSPEPSIA OF PHTHISIS

THE
DYSPEPSIA OF PHTHISIS
ITS
VARIETIES AND TREATMENT

INCLUDING A DESCRIPTION OF CERTAIN FORMS OF DYSPEPSIA
ASSOCIATED WITH THE TUBERCULAR DIATHESIS

BY

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TO
FRIEDRICH DANIEL VON RECKLINGHAUSEN
PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF STRASSBURG

IN ADMIRATION OF HIS PATHOLOGICAL LABOURS

AND

AS A SLIGHT MARK OF GRATITUDE FOR MANY ACTS OF SIGNAL KINDNESS

THIS SMALL VOLUME IS RESPECTFULLY DEDICATED

BY HIS FORMER PUPIL

THE AUTHOR.

PREFACE.

ALTHOUGH dyspepsia has for many years been recognised as an important accompaniment of pulmonary tuberculosis, the subject has received but little attention, and a detailed description of the various aspects it presents in practice has been seldom attempted.

The investigations recorded in the succeeding pages were commenced in the year 1887, and in the first instance they were devoted chiefly to a study of the morbid conditions of the stomach that were to be found after death in cases of phthisis. With the increase and the accumulation of facts, however, it became obvious that the whole of the intestinal tract, as well as the gastric mucous membrane, generally exhibited a characteristic form of inflammation whenever the formation of cavities had taken place within the lungs. At a later period, while acting as house physician at the Brompton Hospital for Consumption, the author was enabled to institute a careful comparison of the various gastric symptoms observed during life, with the state of the digestive tract as

manifested after death. These observations demonstrated the fact, that there exist at least two varieties of dyspepsia associated with phthisis:—one apparently functional and presenting no histological changes in the stomach, while the other is invariably associated with chronic gastric catarrh. The author ventures to believe that a succinct account of these two varieties will prove interesting as well as useful to the practitioner, although many points in the etiology of the disease still require elucidation.

The fact that many of the patients suffered from indigestion for some time prior to the development of the pulmonary affection, appears to indicate that the dyspepsia has some causal relationship with the tubercular disease, or that both complaints are dependent upon the same constitutional dyscrasia. Further and more extended knowledge tended to confirm the latter view, and the book was delayed until sufficient material had been collected to justify the description of two distinct forms of dyspepsia which are intimately associated with the tubercular diathesis (Chapters IV. and V.). The actual connection between organic disease of the stomach and pulmonary tuberculosis is noticed and briefly discussed in Chapter III.

In the preparation of the work I have been

necessarily dependent to a great extent upon the kindness of my friends and professional colleagues, and the material has come to my hand from so many different sources, that it is almost impossible to acknowledge my obligations in an adequate manner. In the first place, however, I would tender my most grateful thanks to my father, Dr. Samuel Fenwick, for the valuable clinical material which he has placed at my disposal, as well as for the many practical suggestions which his unrivalled experience in diseases of the digestive system has enabled him to offer. To Drs. Theodore Williams, Reginald Thompson, and T. H. Green, I am also personally indebted for much of the material which I was able to collect at the Brompton Hospital. I am also under the deepest obligations to the Royal College of Physicians and Surgeons for the exceptional opportunities for research afforded by their Laboratories on the Victoria Embankment, and to the Director, Dr. Sims Woodhead, for the great interest he has shewn in the progress of the work. I would also embrace this opportunity of conveying my sincere thanks to Dr. Vincent Harris, who sent me the notes on the condition of the pancreas and salivary glands in chronic phthisis ; to Dr. Overend, of Edmonton, who gave me the opportunity of seeing

several interesting cases in his practice, as well as superintending the work during its passage through the press; and to my late assistant at the Evelina Hospital, Mr. A. R. Freeland, who afforded me considerable help in the production of the chapter on the Dyspepsia of Strumous Children.

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CONTENTS.

CHAPTER I.

The Morbid States of the Stomach in Pulmonary Tuberculosis—Dilatation—Autodigestion—Chronic Catarrh—Punctiform Hæmorrhages—Ulcerations—Hæmorrhagic Erosions—Follicular Ulcers—Chronic Ulcer—Lardaceous Ulcer—Tubercular Disease *Pages 1-14*

CHAPTER II.

The Pathology of the Gastro-Enteritis of Phthisis—Relative Frequency—Methods of Examination—Histological Appearances—Cirrhosis—Lardaceous Disease—Duodenum—Small Intestine—Colon—Pancreas—Salivary Glands—Etiology—Experimental Production *Pages 15-31*

CHAPTER III.

The Relation of Organic Disease of the Stomach to Pulmonary Tuberculosis—Simple Ulceration—Carcinoma—Chronic Gastritis—Destruction of Stomach by Corrosive Fluids—Illustrative Cases—Conclusions . . . *Pages 32-44*

CHAPTER IV.

The Dyspepsia of Strumous Children—Relative Frequency—Analysis of Cases—Sex and Age—Tendency to Tuberculosis—General Appearance—Symptoms and Progress—Pain—The Bowels—The Appetite—Thirst—Gastric Catarrh—Relapses—Etiology—Treatment *Pages 45-59*

CHAPTER V.

A Form of Dyspepsia which often Precedes the Development of Pulmonary Tuberculosis—Historical—The Atonic and the Irritable Varieties—Symptoms and Progress of the Atonic Form—Pain—Constipation—Flatulence—General—The Irritable Form—Pain—Vomiting—The Bowels—The Appetite—Illustrative Cases—Progress and Termination—Etiology—Treatment—General—Dietetic—Medicinal *Pages 60-103*

CHAPTER VI.

The Variety of Dyspepsia which usually ushers in and accompanies the first stage of Pulmonary Tuberculosis—Nomenclature—General Sketch—Relative Frequency—Analysis of 500 cases of Phthisis—Influence of Sex upon the Development of the Dyspepsia—Influence of the Type of the Lung Disease—Existence of Previous Dyspepsia—Analysis of the Symptoms—Pain—Vomiting—Disorders of the Appetite—Reflex Cough—Flatulence—Acidity—Constipation—The Tongue—Anæmia—Other Symptoms—Examination of the Stomach—Signs and Frequency of Dilatation—Physical signs of the Pulmonary Disease—Physiology—The Secretion of the Pepsin and Hydrochloric Acid—The Absorbing Capacity of the Stomach—The Motor Power—Progress and Termination—Etiology—Treatment—General—Dietetic—Medicinal—Treatment of Special Symptoms *Pages 104-151*

CHAPTER VII.

The Variety of Dyspepsia which accompanies the Final Stage of Phthisis—Relative Frequency—General Sketch—Analysis of Symptoms—Pain—Spurious Gastric Pain—Vomiting—Acidity—Flatulence—The Bowels—The Tongue—Prognosis—Etiology—Treatment . . . *Pages 152-162*

CHAPTER VIII.

Perforation of the Gastro-Intestinal Tract in Phthisis—Perforation of the Stomach—Tuberculous Disease of the Intestine—Relative Frequency—Ulceration of the Appendix Vermiformis—Modes of Termination—Acute Peritonitis—Varieties and Symptoms—Fæcal Abscess—Its Varieties, Physical Signs and Diagnosis—Fistulæ—Other Phenomena . . *Pages 163-196*

Additional Bibliography *Pages 197-198*

Index *Pages 199-203*

THE
DYSPEPSIA OF PHTHISIS.

CHAPTER I.

THE MORBID STATES OF THE STOMACH IN CASES OF PULMONARY TUBERCULOSIS.

DILATATION of the stomach is a very frequent accompaniment of chronic pulmonary tuberculosis, and, indeed, it is rare to perform a necropsy on a case of this nature without encountering some increase in the dimensions of the organ.

Occasionally the enlargement is comparatively insignificant, and the lower margin of the viscus may only extend as far as the umbilicus, but as a rule the dilatation is apparent at a glance and the stomach may even be found to occupy the whole of the anterior aspect of the abdominal cavity. Under these conditions the long axis of the organ tends to assume a somewhat oblique position, and the pylorus becomes displaced downwards and may present itself several inches below its normal position.

Louis* estimated that two-thirds of his cases of phthisis exhibited evidences of dilatation of the

* "Recherches sur la phthisie pulmonaire," 1843.

stomach, while among 100 necropsies on cases of a similar nature 'at which I took special notes on this point the lower margin of the viscus extended below the level of the navel in 64. In 58 instances the pulmonary disease had existed for some considerable time and the lungs presented numerous excavations with more or less fibroid induration. In the remaining 6 cases the tubercular disease was of more recent origin. It may also be noticed that in 6 out of 7 cases of acute miliary infection no obvious increase in the size of the stomach could be detected.

From these facts it would appear that the degree of gastro-ectasis bears a direct relation to the extent and chronicity of the pulmonary lesion, a fact which is borne out by clinical observation.

The stomach usually contains traces of food, and occasionally fermentation of its contents continues for some time after death and the organ becomes distended with gas.

The mucous membrane almost always exhibits some departure from the normal, the most important of which require a separate consideration.

Post-mortem Digestion.—Louis, Andral, and other earlier writers were wont to describe various forms of softening of the walls of the stomach as a frequent result of pulmonary tuberculosis, but it is probable that many of the appearances which they observed were in reality produced after death, and owed their origin to the corrosive action of the gastric juice upon the devitalised tissue. Post-mortem changes in the coats of the organ are met with to a greater or lesser degree in the majority of cases where death has resulted from chronic phthisis; in-

deed, during the summer months, it is rare to perform an examination without discovering some evidence of solution of the mucous membrane.

Occasionally it is merely the summits of the rugæ in the fundus of the organ which appear slightly softened and eroded, the intervening sulci remaining unchanged; but more commonly the whole or greater portion of the fundus is the seat of the pathological change.

In the early stages the surface of the mucous membrane appears to be whiter than normal and very thin, and the superficial layers tend to separate in flakes which can easily be wiped off from the deeper tissues by the finger. In more advanced cases the whole of the cardiac portion of the organ appears to be devoid of mucous membrane, while for some distance around the seat of disease the tissues are extremely soft and pulpy. The colour varies according to the quantity of blood contained in the part. If this is considerable, the tissue appears black, if small, the colour is of a bluish-white tint. The blood-vessels can be seen ramifying in the form of black streaks over the affected area, and when they are cut across their contents can be expressed in droplets of tar-like consistency. As a rule the posterior wall of the stomach is more affected than the anterior, but in some instances the reverse may be observed.

Although the signs of auto-digestion are usually limited to the fundus it occasionally happens that the whole of the inner surface of the organ is affected in a similar manner, but in these cases the mucous membrane in the pyloric region is less seriously damaged than that in other districts.

The process of softening and erosion may proceed to actual perforation of the tunics of the stomach, with extravasation of its acid contents into the cavity of the peritoneum. When this occurs the gastric juice may erode the neighbouring organs such as the liver or spleen, or may even cause perforation of the diaphragm with subsequent softening of the tissue of the lung.* The edges of the aperture are thin, ragged, and very transparent, and they are quite unlike any form of ulceration which occurs during life.

The singular frequency with which post-mortem digestion of the stomach is encountered in cases of chronic phthisis may be explained to a certain extent by the fact that the patient continues to receive nourishment up to the very last, and consequently some amount of digestive fluid is always present in the organ at the time of death. In addition to this, the vitality of the mucous membrane is usually at a very low ebb during the last few days of life owing to the gradual failure of the circulation, and immediately its arterial supply finally ceases it falls a ready victim to the corrosive action of the gastric juice.

Chronic Catarrh.—Chronic inflammation of the mucous membrane of the stomach occurs in a large proportion of the cases of phthisis, and the changes to which it gives rise are often of considerable importance.

Occasionally there is nothing abnormal to be detected with the naked eye except extreme pallor and slight opacity of the tissue, but even in these cases the microscope will often reveal extensive destruction of

* I have only observed post-mortem perforation in one case.

the secreting structures. In other instances the surface of the fundus appears to be mapped out into irregular areas which present a fine vascular injection, while the intervening tissue is either pale or of an ashen-grey colour. The most characteristic sign of chronic catarrh, however, consists of a brownish-black pigmentation of the whole of the mucous membrane, especially in the pyloric region of the organ. When examined by the help of a magnifying lens the summits of the rugæ are found to be studded with a multitude of fine black dots, which by their coalescence give rise to small patches of deeply pigmented tissue. The coats of the organ are always much thickened, and the mucous membrane can often be peeled off from the subjacent muscular tissue in the form of large strips of a leathery consistence. In the neighbourhood of the pylorus the inflammation may involve the submucous and muscular layers so that on section it is often impossible to distinguish with the naked eye the exact limits of the various coats.

One of the most obvious results of the chronic catarrh is the production of numerous irregularities on the surface of the stomach which were first described by Louis under the term "*état mamélonné*." In this condition the mucous membrane is closely beset with a large number of minute elevations arranged in the form of patches or streaks in the neighbourhood of the pylorus. Occasionally the whole of the interior of the stomach is affected in a similar manner, or in rare cases the fundus alone presents any appearance of the disease. Sometimes these excrescences attain a considerable size and

form hemispherical or polypoid tumours attached to the surface by a short stalk.

This abnormal condition of the mucous membrane owes its origin to the contraction of newly formed fibrous tissue situated between the secreting tubules, and is analogous to the nodular appearance of the liver or kidney in cases of chronic interstitial inflammation of these organs.

Mamillation of the stomach is said to be of frequent occurrence in cases of phthisis, but in the post-mortem records of the Brompton Hospital I can only find that it was observed in about 4 per cent. of the cases.

Another result of the chronic catarrh is a peculiar honey-combed appearance of the mucous membrane to which Trousseau gave the name of "*estomac à cellules*." In this condition the inner surface of the organ presents numerous little pits separated from one another by narrow ridges of pigmented tissue or by fine fibrous bands, and thus closely resembles in its general features the appearances of a bladder in a case of chronic cystitis.

In a certain proportion of the cases where the signs of chronic catarrh are well marked the application of a solution of iodine to the surface produces the mahogany reaction indicative of lardaceous degeneration.

Punctiform Hæmorrhages.—It is by no means uncommon to find small extravasations of blood in the mucous membrane of the stomach after death from chronic phthisis when it is associated with dilatation of the right side of the heart. In recent cases the hæmorrhages are scattered over the whole of the cardiac portion of the organ especially on the pos-

terior surface near the greater curvature, but occasionally the anterior wall is affected to a corresponding degree. The disease presents itself in the form of circular or oval spots of a bright red colour, varying in diameter from a few lines to a centimetre or more. Sometimes these recent extravasations are associated with others of older date in which the vivid red tint has become brown or black owing to the action of the gastric secretion; or perhaps a faint stain on the surface of the mucous membrane is all that remains to mark the site of a previous hæmorrhage.

As a rule the disease is strictly limited to the mucous coat, but occasionally it may extend into the submucous or even the muscular layer.

When hæmorrhages occur as a result of chronic catarrh the pyloric region is the part of the organ most commonly affected, and the extravasations may attain a considerable size.

Ulceration of the Stomach.—Various forms of ulceration of the stomach are encountered in cases of chronic phthisis. In some instances the lesion is obviously of old standing and in no way connected with the lung complaint. In others the disease appears to have originated a short time before death; while occasionally the ulceration owes its origin to the same cause as that which produced the pulmonary mischief.

Hæmorrhagic Erosions.—The simplest variety of ulceration is the so-called hæmorrhagic erosion. It has already been shewn that minute effusions of blood are apt to occur in the mucous membrane of the stomach shortly before death owing to congestion of the organ from failure of the right chambers of the heart. If, however, life be prolonged for a few

hours and the gastric secretion is in an active state, these punctiform hæmorrhages may undergo digestion and become converted into actual abrasions. The fully developed erosion presents the appearance of a small circular ulcer surrounded by a slightly elevated and tumid ring of pale yellow colour. The base of the ulcer is shallow and is usually formed by the deeper layers of the mucous coat, but occasionally the muscular tunic may be laid bare.

Under the microscope the origin of the disease is easily recognised in the early stages by the ragged outline of the edge and the presence of effused blood in the surrounding tissue. These ulcers tend to heal rapidly and are probably devoid of any clinical significance.

Occasionally the inner surface of the stomach is found to be studded from the cardiac to the pyloric orifice with numerous small circular ulcers, several centimetres in diameter.* This variety seldom extends deeper than the muscular coat of the organ, but sometimes the serous membrane may be exposed. The edges are sharp and often undermined, the base smooth and somewhat yellow in colour, while the surrounding tissue appears highly injected with blood.

No tubercles can be discovered, and the microscope fails to demonstrate any specific cause for the disease.

This form of gastric ulcer is often encountered in children who have succumbed to general tuberculosis, but I have never observed it in adults. It is possible

* Paulici, "Berlin Klin. Woch.," 1867, p. 349; Steiner, "Prag. Vierteljahr.," 2, 1865; Rilliet et Barthez, "Traité des Malad. de l'enfance," 3, p. 833; Barlow, "Path. Trans.," 38, 1887, p. 142.

that it arises some days before death as a result of hæmorrhage into the mucous membrane.

Follicular Ulcers.—In many cases of pulmonary tuberculosis the mucous membrane of the stomach presents numerous small circular ulcers which vary in size from a few lines to two centimetres in diameter. The edges of the excavation are slightly raised and either of a pale yellow colour or surrounded by a zone of highly injected capillaries. The disease seldom extends deeper than the submucous coat, but occasionally the mischief appears to be progressive and the base of the ulcer may involve the muscular or even the serous tissue.

This variety of ulceration was noticed by Wilson Fox in 12 per cent. of his acute and 18 per cent. of his cases of chronic pulmonary tuberculosis. It is particularly apt to occur in children who have succumbed to acute miliary tuberculosis, and among 10 consecutive cases of this disease which I examined at the Evelina Hospital, well marked follicular ulceration was present in 4.

By the aid of the microscope the disease can be ascertained to originate in the masses of lymphoid tissue which exist in the deeper layers of the mucous membrane. In the human subject the solitary glands of the stomach reach their highest point of development between the ages of six months and ten years, but at a later period of life the follicles seem to undergo a retrograde metamorphosis and can only be detected with the naked eye in the pyloric region near the lesser curvature.*

* Author, *Acute Perforating Ulcer of the Stomach*, "Jour. of Path.," June, 1893.

On examining a case which presents the signs of follicular ulceration, the adenoid tissue is found to be increased in amount throughout the whole area of the stomach, and the various stages of the disease can easily be made out.

In the earliest stage the solitary gland becomes enlarged and swollen and the mass tends to lose its definite outline. After a time many of its cells may be seen to encroach upon the neighbouring tissues and form a layer over the surface of the muscularis mucosæ for a considerable distance on either side of the follicle. The swollen gland now presses upon the gastric tubules which surround and cover it in, and gradually causes destruction of those in its immediate neighbourhood. The mucous membrane over the surface of the follicle becomes thinned out and atrophied from pressure, and in many instances a portion of it is drawn into the centre of the adenoid mass and undergoes rapid disintegration. About the same time the cells in the centre of the follicle lose their individual outlines and undergo a process of softening, so that in a short time the interior of the gland becomes semi-fluid in consistency. The final stage of the disease consists in rupture of the thin layer of mucous membrane which covers the minute abscess, and the contents of the follicle are discharged into the cavity of the stomach. The subsequent fate of the ulcer depends upon the activity of the gastric juice, the disease either healing or enlarging its circumference.

This variety of ulcer was formerly ascribed to the presence of miliary tubercle.

Chronic Ulcer.—It is by no means uncommon to

find a simple chronic ulcer in the stomach of a person who has succumbed to pulmonary tuberculosis; and, indeed, so often do the two diseases co-exist, that some writers have attempted to establish a causal relationship between them. But it is probable that undue stress has been laid upon this point, and that the frequency with which the two affections are associated is more apparent than real. Thus Dittrich* only found 4 open ulcers in 403 necropsies on cases of phthisis, and among 1000 post-mortem examinations performed at the Brompton Hospital I could only find the presence of gastric ulcer noted in 9 instances.

When the disease does occur the ulcer always presents the appearance of a very chronic affection, possibly owing to the fact that the congestion of the stomach which ensues from the lung disease tends to retard the healing of the sore. The walls are much thickened and indurated, and when situated in the neighbourhood of the pylorus the contraction of its edges may cause obstruction of the orifice and produce dilatation of the stomach. In other respects the disease is identical with the ordinary form.

There is, however, one variety of the simple kind which appears to me to merit special recognition. It is occasionally observed that persons who die from a very chronic form of phthisis present numerous *shallow* ulcers in the immediate vicinity of the pylorus. In these cases the disease is usually oval or boat-shaped in outline, its long axis being placed obliquely to that of the stomach. The edges of the excavation are smooth, sloping, and free from indura-

* "Prag. Vierteljahr.," 1848, 2, p. 152.

tion; the base is shallow and situated in the deeper layers of the submucous coat, and is often much pigmented. The ulcer seldom exceeds a bean in size and is often much smaller.

Under the microscope the mucous membrane in the vicinity of the sore is seen to be in an advanced state of chronic catarrh, and gives a deep reaction with iodine or methyl-violet. The edges and floor of the ulcer present abundant evidences of precedent hæmorrhage in the form of blood pigment, while the various blood-vessels are the seat of extensive lardaceous degeneration and occasionally exhibit thrombi of old date.

It would, therefore, appear probable that in some cases lardaceous disease of the vessels in the pyloric region of the stomach gives rise to interstitial hæmorrhage in the mucous membrane, and that the tissue, devitalised in this manner, is slowly digested by the gastric secretion with the formation of a chronic ulcer.

Tubercular Disease.—Tubercular affections of the stomach are exceedingly rare. In cases of general miliary tuberculosis the peritoneal surface of the organ occasionally presents a few grey granulations, but these are merely a part of the peritoneal disease. In rarer instances, and usually in children, minute yellowish-white tubercles may be found in the submucous tissue of the stomach in the region of the pylorus. These, however, must not be confounded with a somewhat similar appearance presented by a general enlargement of the solitary glands. When tubercles occur in the submucous tissue they seldom proceed to ulceration, more commonly caseation takes place without destruction of the mucous membrane.

True ulceration of the stomach resulting from tuberculous disease is very seldom encountered. Louis* never met with an example and Andral† only mentions two. After a careful search I have only been able to discover the records of twenty-four cases of this affection and several of these are open to suspicion; while among the notes of 2000 necropsies on cases of phthisis performed at the Brompton Hospital I could only find 2 instances in which the disease was encountered.

With only three exceptions the gastric complaint was found to be associated with a similar condition of the intestinal tract, and in the majority of the cases the lungs and sometimes the spleen and peritoneum also exhibited evidences of tubercular mischief.

The ulcer itself varies in size from two or three lines to several centimetres in diameter. Its favourite seat is in the pyloric end of the organ near the lesser curvature, and it is often multiple. In shape it also varies considerably; in some cases it is circular, in others oval, while in not a few the outline is very irregular and presents a scalloped appearance. The edges are usually raised above the surrounding tissue like a rampart (Edinger), and are thickened and nodulated. Occasionally, however, the disease may closely simulate in its features the simple perforating ulcer and appears as if it had been punched out of the mucous membrane. The base is shallow and generally formed by the submucous coat, and presents a yellowish tinge and granular aspect. In many instances a number of discrete tubercles may be observed scattered through the mucous membrane in

* *Op. cit.*

† "Clin. Medical.," 10, p. 266.

the immediate neighbourhood. The peritoneal aspect of the disease almost always exhibits a few miliary tubercles, and not unfrequently it is attached by a layer of lymph to some other organ such as the liver, pancreas or colon. The lymphatic glands along the lesser curvature and in the retroperitoneal tissue are enlarged and caseous.

On microscopic examination the edges and base of the ulcer present the typical tubercular structure in which both giant cells and the bacilli are easily demonstrated.

The great rarity of tuberculous disease of the stomach appears to depend upon two principal causes. In the first place, unlike the intestine, the stomach only contains a small amount of lymphoid tissue, which is deeply situated in the substance of the mucous coat. In the second, the acid secretion of the organ, though it may not actually destroy the bacilli, is distinctly inimical to their growth, and hence even when they are introduced in large quantities into the stomach by means of the swallowed expectoration, they are rendered temporarily inert, and are passed on into the small bowel without having effected a permanent lodgment.

In the majority of cases the presence of a tubercular ulcer in the stomach produces but few symptoms, and exerts little influence on the progress of the primary disease, but occasionally it may give rise to severe hæmorrhage.*

* See Chap. VII.

CHAPTER II.

THE PATHOLOGY OF THE GASTRO-ENTERITIS OF PHTHISIS.

THE first accurate description of the histological changes which are met with in the stomach in cases of chronic phthisis is to be found in the writings of Fox,* Jones,† Samuel Fenwick,‡ and Habershon,§ although Louis,|| Andral,¶ Stokes** and many others at an earlier date had published excellent accounts of the macroscopic appearances of the disease. Of late years Marfan,†† Schwalbe,‡‡ and several other continental pathologists have added to our knowledge of this subject.

The various writers differ considerably among themselves as to the frequency with which the stomach is affected by inflammation in cases of pulmonary tuberculosis. Wilson Fox found that the disease existed in about 62 per cent. of his cases of phthisis, while Lebert§§ had previously noted its

* "Diseases of the Stomach," 1872, p. 124.

† "Diseases of the Stomach," 1854, p. 74.

‡ "Morbid States of the Stomach and Duodenum," 1868, p. 189.

§ "Diseases of the Stomach," 1869, p. 141.

|| *Op. cit.*

¶ *Op. cit.*

** "Cyclop. of Med., Art. Enteritis," vol. ii., 1833.

†† "Troubles et lésions Gastriques dans la Phthisie Pulmonaire," Paris, 1887.

‡‡ "Virchow's Archives," 117, p. 316, 1889.

§§ "Brustkrankheiten," 11, p. 135.

presence in about one-fifth of his chronic and one-eleventh of his acute cases.

Marfan's description of the disease is based upon an examination of the stomach in 27 cases of phthisis, in 18 of which (66 per cent.) he was able to detect signs of inflammation. Schwalbe examined 25 cases, and of these 14 (56 per cent.) presented appearances of chronic catarrh, while only 6 were described as normal.

My own observations were conducted upon 50 cases of pulmonary tuberculosis taken haphazard from the post-mortem room. In each instance small pieces of the stomach were removed from the cardiac, middle, and pyloric zones of the organ and placed in some fixing medium, such as absolute alcohol, Foa's solution, or perchloride of mercury (one per cent.). The sections were cut in various ways, some being frozen, while others were embedded in paraffin or celloidin. Hæmatoxylin and eosin were chiefly employed as staining reagents, but in almost every instance some of the sections were also submitted to methyl violet and osmic acid in order to determine the existence of lardaceous or fatty changes.

The investigation had not proceeded far before it became obvious that the gastric disease did not accompany every case of phthisis, but was apparently limited to chronic cases associated with cavities in the lung; and at the termination of the enquiry when I came to compare the state of the pulmonary disease in each case with the morbid appearances presented by the digestive tract, I found that the stomach and intestine were seldom affected unless softening had already taken place in the tuberculous

material. The chief results of my observations are shown in the following table:—

CONDITION OF LUNG DISEASE.	NO. OF CASES.	INTERSTITIAL GASTRITIS.	PARENCHYMATOUS GASTRITIS.	LARDACEGUS DISEASE.
Miliary tuberculosis	10	—	2	—
Caseous tubercle (without cavities)	13	2	1	—
Tubercle with cavities	27	23	6	8

Among the cases of miliary tuberculosis 8 were children and 2 adults. Signs of interstitial inflammation of the stomach were never observed in these cases, although in two instances a swollen and granular appearance of the peptic cells with débris in the lumen of the glands, seemed to denote the existence of some degree of parenchymatous catarrh.

In the second class of case the lungs were more or less extensively affected by tubercle in the form of caseous masses which had not yet proceeded to the formation of vomicæ. In only two instances of this kind was there any indication of round cell infiltration in the pyloric region of the stomach, and in neither case was the disease of more than moderate intensity. The great majority of the cases I examined presented cavities in the lung, and among 27 of these only 4 failed to exhibit some evidence of gastric inflammation, while in some the disease was so marked as to give rise to the appearance of cirrhosis of the mucous membrane. The association of the gastric lesion with pulmonary excavation has been especially commented upon by Marfan, but Schwalbe omits to give any definite information concerning the state of the pulmonary disease in his various cases.

Histology.—The essential feature of the disease consists of an interstitial inflammation of a chronic type affecting in a varying degree of severity the whole of the gastro-intestinal tract from the stomach to the rectum, with secondary changes in the glandular structures.

The stomach.—The disease usually commences in the pyloric region and is always most advanced in this position.

The earliest deviation from the normal consists of a slight infiltration of round cells into the inter-tubular connective tissue. According to Marfan this invariably occurs in the most superficial layers of the mucous membrane, but I quite agree with Schwalbe in considering this statement to be too dogmatic. In many instances the disease commences around the fundi of the gastric tubules, while in others the inflammation affects discrete areas of the mucous membrane, the diseased patches being separated from one another by tracts of healthy tissue. It is also probable that proliferation of the connective tissue corpuscles takes place, thus increasing the number of cell elements which develop between the tubules. The small veins situated in the submucous coat are usually distended and filled with blood, and the capillaries which ramify beneath the superficial epithelium and around the glands shew similar signs of engorgement. The columnar epithelium which normally covers the surface of the mucous membrane becomes detached in places, and its cells may often be observed entangled in the tenacious mucus which forms a coating over the whole of the inner surface of the organ. The ducts of the glands seldom present any notice-

able alteration, with the exception of an increase in the number of their goblet cells, and an occasional round cell which has wandered in from the interstitial tissue. The central and parietal cells of the peptic glands are unaffected. One of the most remarkable features in the section is the great increase which usually takes place in the size and number of the solitary lymphatic glands. Under normal conditions these small collections of lymphoid tissue are quite insignificant; but when the mucous membrane becomes the seat of an inflammatory affection they rapidly swell, and their constituent cells not only press upon and obscure the gastric tubules in their immediate vicinity, but diffuse themselves throughout the whole substance of the tissue, and often form a thick layer over the surface of the muscularis mucosæ for some distance on either side of the follicle. Occasionally these little glands attain a considerable size, and either make their way toward the surface and produce the follicular form of ulceration already described, or perforate the muscularis mucosæ and establish a communication with similar collections of adenoid tissue situated in the submucous coat of the stomach.

As the disease progresses the accumulation of inflammatory products between the tubules tends to compress these secreting structures, and to give rise to secondary degenerations of their epithelium. Thus in a case of moderate severity the following appearances at once attract attention.

The mucous membrane, especially towards the surface, appears to be densely infiltrated with small round cells, so that the tubular glands can no longer

be traced clearly throughout their entire length. The epithelium upon the surface consists merely of a few scattered clumps of granular and shrunken cells, with here and there a goblet cell full of mucus. The minute blood vessels are engorged, and occasionally slight thickening of their inner coats can be observed. The mouths of the gland-ducts are widely dilated, the columnar epithelium exhibiting an unusual number of mucus secreting cells, and the lumen being blocked by a granular débris, a few nuclei, and sometimes fat globules. In the centre of the mucous membrane it is often impossible to detect the exact outlines of the glands, owing to the compression and distortion to which they have been subjected by the inflammatory exudation in the interstitial tissue; and the difficulty which is thus offered to the exit of the glandular secretion gives rise to a series of changes in the secretory cells. At first both the parietal and central cells appear to be somewhat swollen and granular, and encroach considerably upon the lumen of the tube; but as the disease progresses, the tubules commence to dilate and assume an elliptical and finally a globular shape. The basement membrane becomes thickened and the cells which line it undergo a series of transformations. The nucleus becomes obscured, the protoplasm of the cell loses its granular aspect and becomes clear and unaffected by ordinary dyes, and the cell itself changes from polygonal to columnar shape. In this manner a retention cyst is formed which eventually becomes lined by a single layer of columnar epithelium.

About this time the inflammatory products commence to undergo organisation, and small tracts of

fibrous tissue make their appearance between the tubules, and by the traction which they exert still further compress and distort the glandular structures. The inflammation seldom extends into the submucous coat, but the muscularis mucosæ often suffers severely. In some cases the surface of the stomach presents a peculiar papillary or villous appearance which at first glance causes the tissue to resemble a section of the small intestine. These spurious villi are due to a

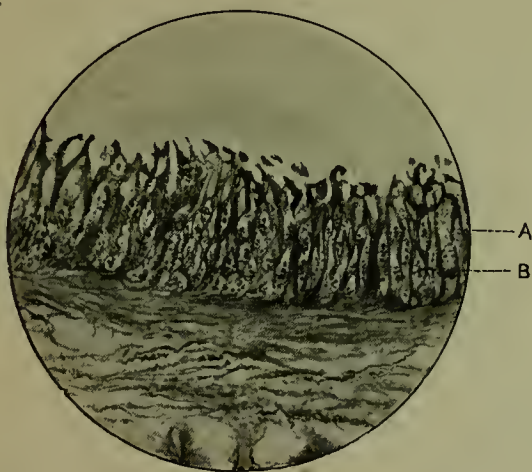


FIG. 1.—Section of a stomach from a case of chronic phthisis, showing an excess of fibrous tissue (A), between the glands and fatty degeneration of the secreting cells (B). $\times 50$.

prolongation of the interstitial fibrous tissue between the mouths of the ducts, and consist entirely of small round cells with a few spindle cells.

In the last stage of the disease the mucous membrane becomes the seat of a diffuse cirrhosis. The ever increasing amount of fibrous tissue between the tubules gradually produces a complete atrophy of the parenchyma, but even in very advanced cases the

disease never exhibits a uniform distribution. Occasionally the submucous tissue is affected in a similar manner, and in a few cases I have observed the whole thickness of the stomach in the pyloric region to present a fibroid appearance.

In addition to the general features of the disease which have just been described, there are one or two points which deserve notice. Fox, Fenwick, and Schwalbe, have described parenchymatous inflamma-



FIG. 2.—Section from the pyloric region of the stomach in the case of chronic phthisis, showing a moderate degree of interstitial inflammation (A), with cystic disease of the glands (B). $\times 50$.

tion of the stomach as an occasional accompaniment of the interstitial disease, although its occurrence is denied by Marfan. Among my own cases I have observed six instances where chronic tubular gastritis co-existed with the ordinary variety, and in each case the degenerated cells in the tubules gave a distinct reaction with osmic acid. This condition is usually best marked in the fundus of the organ, and I might

add that in my cases it was often associated with similar changes in the parenchyma of the kidney.

In many instances, during the early stages of the disease, numerous highly refractile bodies, of an oval shape and about the size of a nucleus, can be discerned scattered through the substance of the mucous membrane, both in the tubules and in the surrounding connective tissue. These bodies are unaffected by hæmatoxylin but sometimes assume a reddish tint with eosin. They appear to consist of a material allied to hyaline, and are possibly formed out of the protoplasm of the peptic cells.

Lardaceous Degeneration of the Stomach.—Contrary to the statements of Marfan, I have frequently observed lardaceous disease associated with chronic interstitial inflammation of the stomach, and among my twenty-five instances of this affection no fewer than eight exhibited the characteristic reaction with methyl-violet and iodine. In every instance the liver, spleen or kidneys, shewed evidences of a similar affection. The disease usually commences in the pyloric region, the inner and middle coats of the interglandular capillaries being the first to show signs of degeneration. Next in frequency come the capillaries which ramify on the surface of the mucous membrane, and the larger vessels situated in the neighbourhood of the blind extremities of the gastric tubes, and in the submucosa. In advanced cases almost the whole of the tissue of the stomach may be affected. Large areas of the muscular tissue, as well as their nutrient vessels, are completely lardaceous. The connective tissue elements give a brilliant reaction with the aniline dye, and even the peptic

cells may suffer. The vessels which enter the lymphoid follicles are early affected by the disease, and a marked atrophy of the gland is usually observed in advanced cases; but the adenoid elements themselves possess a considerable degree of resistance toward the lardaceous change.

The effect of the disease in giving rise to dilatation of the stomach and suppression of the secretion of the hydrochloric acid will be referred to subsequently.

The Intestines.—The whole of the intestinal tract usually participates in the same pathological change which have just been described. The small bowel exhibits the most characteristic features of the disease, and the duodenum is apt to suffer more severely than either the jejunum or the ileum.

Duodenum.—The first change consists of an infiltration of small round cells into the deeper layers of the mucous membrane, around the bases of the villi and between the glands of Lieberkühn. The subsequent stages of the disease are closely similar to those which take place in the stomach. The mucous membrane undergoes a gradual cirrhosis, and the glands become cystic, or more commonly their epithelium desquamates and undergoes fatty degeneration. As the disease advances the villi shrink and become distorted, finally assuming a variety of grotesque shapes. Sometimes the apex of the villus is approximated to the base so that the process comes to lie parallel with the surface of the mucous membrane, which then resembles a field of thin corn that has been laid by a severe storm. In the final stage the tissue of the villus is converted into a mere fibrous thread, and becomes twisted or coiled upon itself

until it is almost unrecognisable. At the commencement of the disease the epithelium over the surface is converted into a row of goblet cells, but these subsequently become detached, and the villi remain permanently denuded.

The inflammatory process exhibits a marked tendency to invade the submucous tissue in the direction of the ducts of Brunner's glands. The connective tissue between the convoluted extremities of these tubular structures becomes thickened by the formation of fibrous tissue, and the secreting epithelium undergoes secondary degeneration. The cells become swollen and obscure the lumen of the tubule, and their protoplasm presents a clear and glistening appearance, and stains with difficulty. The nucleus is pressed against the basement membrane of the cell, and acquires an extremely granular aspect. Occasionally the epithelium desquamates freely, but I have not often detected evidence of fatty degeneration in it. The muscular coat is seldom affected to any appreciable extent, although it is not uncommon to find a number of round cells between the various fasciculi of the tissue.

The other portions of the small intestine present similar evidences of chronic interstitial inflammation, but I have seldom observed the villi shrivelled to the same extent as in the duodenum.

The colon and cæcum suffer in a similar manner.

In nearly every instance of lardaceous degeneration of the abdominal viscera the intestines show signs of the disease, and in the post-mortem records of the Brompton Hospital nearly 67 per cent. of the cases are stated to have given the iodine reaction.

I am indebted to Dr. Vincent Harris for the following notes on the condition of the salivary glands and the pancreas.

Salivary glands.—The parotid and sub-maxillary glands were examined in six cases where death had occurred from chronic phthisis. In some instances the tissue appeared on section with the scalpel to consist almost entirely of fibrous material, the glandular structure being scarcely visible to the naked eye. On microscopic examination the fibrous tissue which normally exists in the inter-alveolar spaces and in connection with the blood-vessels and ducts was found to be immensely increased in amount, and the parenchyma appeared to have undergone atrophy. The morbid process which results in this fibrous change seems to be more of the nature of a hyperplasia than of an inflammation, unless of a very chronic type.

Pancreas.—The changes in this organ are closely similar to those observed in the salivary glands, the only difference being that the fibrosis is more patchy and localised than in the other case. The fibrous tissue is found to be more or less increased in connection with the larger and smaller ducts, and also in the inter-alveolar spaces along the lines of the blood-vessels.

The exact *etiology* of the gastro-intestinal catarrh has excited a considerable amount of discussion, and is still far from being satisfactorily settled. The following facts, however, are worthy of consideration :—

1. *The morbid condition is not the result of pyrexia.*

In the majority of the specific fevers the stomach presents changes of an inflammatory character, notably in scarlatina, measles, small-pox, erysipelas and cholera, and it has therefore been suggested that in cases of phthisis the continued fever is capable of exerting an equally deleterious effect upon the various mucous membranes. Recent investigations, however, tend to show that in all infective diseases certain substances of a chemical nature are formed by the activity of the specific micro-organisms, and that these products are the source both of the pyrexia and also of the structural changes which are apt to occur during the course of the disorder. It is clear, therefore, that the former theory which taught that fever was the immediate source of organic disease must be abandoned in favour of the view that both the pyrexia and the lesions of the tissues are results of the same cause. It is also worthy of notice that in cases of general tuberculosis, where the degree of pyrexia is often considerable and persists throughout the whole course of the complaint, no signs of inflammation of the gastro-intestinal tract can be discovered after death; while in chronic phthisis no direct relation can be observed to obtain between the degree of fever and the severity of the inflammatory lesions.

2. *The disease does not arise from direct irritation of the mucous membrane.*

It has been supposed by some that the gastric catarrh owes its origin to the abuse of alcohol, since among that class of individuals which constitute the great bulk of hospital practice, a history of intemperance can frequently be obtained. But against this

view there are several objections to be urged. In the first place the gastric disease is not encountered in those cases where death occurs before excavation of the lung has taken place; and secondly, the morbid condition of the stomach in phthisis differs considerably in its histological features from that which arises from the abuse of ardent spirits. Other writers have attributed the disease to the irritant action of the various products of fermentation, but this theory is open to similar objections.

3. *The gastritis is not a result of lardaceous disease.*

The chronic form of renal mischief which is so frequently encountered after death from phthisis is supposed by some to depend upon malnutrition of the secretory structures, brought about by lardaceous degeneration of their nutrient vessels. Whatever truth there may be in this theory the gastric catarrh owns no such cause. Not only does amyloid disease of the stomach occur independently of interstitial inflammation, but in many of the best marked examples of the gastric disease I have ever encountered no evidence of lardaceous degeneration could be detected.

4. *The gastritis is not a direct result of tubercularisation.*

In order to ascertain whether the tubercle bacilli were responsible for the disease through the medium of their chemical products, I instituted a series of experiments with Koch's tuberculine.* The animals selected consisted of rabbits, guinea-pigs and rats, and the substance was administered hypodermically in doses varying from .002 gr. to .3 gr. daily for a considerable period of time. When the animals were eventually killed their stomachs failed to exhibit any trace of

interstitial gastritis. These results, coupled with the fact that acute general tuberculosis in man is never associated with histological changes in the stomach, although in this disease a large quantity of the bacillary products are presumably present in the circulation, appear to suggest that the gastric catarrh is not a direct result of the tubercular infection.

5. *The gastritis is probably due to the chronic absorption of certain toxic substances which are manufactured in the pulmonary cavities.*

It has frequently been suggested that the gastro-enteritis arises from septic absorption from the lung (Stokes, Pollock, Marfan, &c.), and this conclusion seems to be warranted by the following facts:—1. The disease only occurs during the last stage of phthisis after vomicæ have been formed. 2. It is usually associated with an intermittent form of pyrexia suggestive of septic origin. 3. In those cases where the tuberculous disease becomes arrested the gastric complaint also subsides. 4. The simultaneous affection of several organs (stomach, intestine, kidney, pancreas, salivary glands) by a similar pathological change indicates the existence of a general cause. 5. The same variety of inflammation is apt to occur in cases of bronchiectasis and caries of the spine or hip associated with long continued suppuration.

Marfan and Breville have been able to isolate a chemical substance from the pulmonary cavities in cases of phthisis which possessed toxic properties when injected into animals, though it did not appear to produce any noticeable change in the mucous membrane of the gastro-intestinal tract. Before I was acquainted with the work of these observers, I had

undertaken an investigation of a somewhat similar nature. Large quantities of expectoration were obtained from cases of phthisis which presented the physical signs of excavation along with the symptoms of gastritis, and immediately mixed with an excess of absolute alcohol. After a lapse of several weeks the material was filtered through linen, and the semi-solid residue extracted with distilled water and added to the original filtrate, the whole being afterwards evaporated to a small bulk in vacuo at a temperature of 38° C. The syrupy liquid obtained in this manner was then thrown into a large excess of absolute alcohol, and the coagulated proteids separated by filtration and again extracted with distilled water. This process was repeated several times, and finally the alcoholic precipitate was collected, and dried in vacuo. In this manner a yellowish-brown powder was obtained, which was easily soluble in distilled water, of a neutral or slightly acid reaction, and possessed of the general chemical properties of proteose matter. When this substance was injected into animals in the proportion of 0.1 gram. to 0.3 gram. per kilo of the body weight, it was usually followed by convulsions, and death often ensued from respiratory failure within half an hour. The necropsy revealed intense congestion of the whole of the gastro-intestinal tract with numerous hæmorrhages both there and in the substance of the kidney. Further investigation, however, has not enabled me to repeat these curious results; and although several litres of expectoration from different cases have been subjected to the same chemical process, the proteid extract never exhibited the same intensely toxic properties. Occasionally when

a strong solution had been exposed to the air for twenty-four hours, its injection was followed by severe illness or death, even after being filtered through porcelain, but the microscope seldom revealed any decided evidence of gastric catarrh.

CHAPTER III.

THE RELATION OF ORGANIC DISEASE OF THE STOMACH TO PULMONARY TUBERCULOSIS.

THE question whether structural lesions of the stomach should be regarded as a predisposing cause of pulmonary tuberculosis has proved a fruitful theme for discussion.

Dittrich* appears to have been the first to draw attention to the fact that chronic ulcer of the stomach is frequently found to be associated with tubercular disease in the lung, and he put forward the view, which has found considerable acceptance, that a relationship of a causal character exists between the two diseases.

There can be no doubt that gastric ulcer and pulmonary tubercle are often associated in the same individual, but before it can be accepted that the disease of the stomach can predispose to the acquirement of phthisis, two important questions require to be answered in the affirmative. In the first place, does gastric ulcer occur with unusual frequency in cases of phthisis? and secondly, is it true that the subjects of ulceration of the stomach are exceptionally prone to fall victims to the pulmonary disease?

At the outset of the enquiry I would remark that

* "Prager, Vierteljahr.," 1844, iii., p. 11.

many writers have included among their arguments the existence of cicatrices or hæmorrhagic erosions in the mucous membrane of the stomach, placing these evidences of disease in the same category with chronic ulcers, as though the evidence to be derived from each was of equal value. But it is obvious that the discovery of a scar, although it may indicate that an ulcer had existed at one time or another, can afford no clue as to the time which has elapsed since the healing of the sore ; and it is, therefore, quite unwarrantable to attribute a recent pulmonary disease to an affection of the digestive organ which has itself undergone complete cure.

With regard to the hæmorrhagic erosions it has already been pointed out that they either arise during the last few hours of life, or accompany chronic inflammation of the mucous membrane ; and since this latter condition is itself a result, and never the cause, of the lung disease, such erosions can possess no possible connection with the development of the phthisis.

With regard to the relative frequency of gastric ulcer in cases of pulmonary tuberculosis, Dittrich* found only 4 open ulcers and 23 scars among 403 necropsies on persons who had succumbed to phthisis, while Wilson Fox never observed its occurrence in the cases which he analysed.†

After a careful examination of the post-mortem records of the Brompton Hospital, I have only been able to discover that a simple chronic ulcer of the stomach was observed nine times in 1000 cases of

* "Prager Vierteljahrs.," 1848, ii., p. 152.

† "Diseases of the Lungs and Pleura," p. 606, foot-note.

phthisis, or in the proportion of '9 per cent. According, however, to an elaborate calculation by Welch,* which was based upon the results of more than thirty-two thousand necropsies, gastric ulcer is found is no less than 2 per cent. of persons dying of all forms of disease, and hence it would seem that in cases of phthisis chronic ulceration of the stomach is, if anything, encountered rather less frequently than in other organic complaints.

Statistical evidence with reference to the second question appears at first sight to lend some colour to the theory of Dittrich, for according to Papellier† tubercle in the lung was encountered in eighteen per cent. of all his cases of gastric ulcer, while Engel‡ and von Jacsch§ estimate its frequency at nineteen to twenty per cent. Among 110 cases collected by Steiner,|| in which either an ulcer or a cicatrix was present in the stomach, pulmonary tuberculosis was discovered in 33, but here it will be noticed that both scars and open sores are grouped together.

Bertholds¶ found tuberculosis complicated the gastric disease in 46 out of 263 cases, or in the proportion of sixteen per cent.** Among 100 necropsies on cases of gastric ulcer which were performed at the London

* Pepper's "System of Medicine," Art. *Gastric Ulcer*.

† *Combination der Tuberculose mit dem runden Magengeschwür*, "Dissert. Erlangen," 1854.

‡ *Ueber Geschwüre*, "Prag. Vierteljahr.," x., 4, 1853.

§ "Prag. Vierteljahr.," iii., 1844, p. 9.

|| *Das Chronische corrosive Magengeschwür*. "Dissert. Berlin," 1867.

¶ *Statistischer Beitrag zur Kenntniss des Chronischen Magengeschwür*. "Dissert. Berlin," 1882.

** Rokitansky ("Oestr. Zeitsch." N. F. 17) found active tubercular disease in only two out of 44 cases of gastric ulcer, and Sangalli ("Congr. Med. d. Paris," 1867, p. 67) never observed it in 35 necropsies on cases of a similar nature.

Hospital, tubercle in one or other lung was found on sixteen occasions, but in the majority of these cases the disease was of the fibroid type, and in three instances calcareous.* From these facts it is probable that about sixteen to eighteen per cent. of all cases of chronic ulcer of the stomach show some evidence after death of tubercular disease of the lung.

But, as Brinton pointed out long ago, phthisis is responsible for no less than eighteen per cent. of the total number of deaths occurring in persons above the age of twenty years, and hence the argument that about twenty per cent. of the cases of gastric ulcer present signs of pulmonary tuberculosis, only proves that the subjects of this complaint are quite as liable to die of phthisis as any other class of individuals.

It has been suggested that an ulcer of the stomach might lead to the development of phthisis by acting as the seat of local infection, and several cases which have been related at different times are claimed to support this theory. But a careful examination of three of these cases does not establish the supposition that the gastric ulcer was the starting point of the tubercular disease, while in the fourth the ulcer appears to have been tuberculous from the outset.†

Rokitansky‡ held that carcinoma and tubercle were incompatible and consequently were never associated in the same subject, but some writers have declared that malignant disease is particularly apt to attack

* A syphilitic history exists in about ten per cent. of cases of this kind.

† Buhl (Henle and Pfeifer's "*Zeitsch.*," 1857), Murchison ("*Path. Trans.*," 1869, p. 174), Payne ("*Path. Trans.*, 21, p. 199), Klebs (Virch. "*Archiv.*," 44, p. 269).

‡ "*Path. Anat.*," vol. i., p. 300, 1885.

persons who exhibit a predisposition to tubercular disease.*

In a great number of persons who succumb to cancer of the stomach, evidences of tubercular disease of the lung are discovered. Thus Dittrich† found this condition in the majority of the 160 cases of gastric cancer which he examined. It is, however, worthy of particular notice that in only two of these was the lung disease of a progressive character, while in the rest it was either stationary or obsolescent. Further observation seems to confirm the opinion of Rokitansky, for although cretaceous masses are often found in the lung after death from carcinoma, the disease is never active, and I have only once been fortunate enough to see a case which presented at the same time carcinoma of the body of the stomach and recent phthisis at the left apex. Among 120 necropsies performed on cases of cancer of the stomach which I have examined with reference to this point, tubercle in the lung was discovered in 8 instances, but in only one of these was the pulmonary disease of recent date, while in the rest it was completely obsolescent.‡

It may therefore be inferred that far from cancer of the digestive organs predisposing to the inception of tubercle, the two diseases are seldom encountered in an active state in the same individual.

Pulmonary tuberculosis cannot be regarded as a frequent sequela of chronic gastric catarrh. It is true that phthisis not unfrequently coexists with

* Christison "Suggestions to Medical Referees of Standard Life Assurance Company," p. 11, 1852.

† "Prager Vierteljahrs.," 1848, xvii., p. 27.

‡ These statistics were obtained from the records of the London Hospital.

gastritis of alcoholic origin, but in this case it is probable that both the gastric disorder and the pulmonary complaint owe their origin to the same cause. In like manner the chronic inflammation of the mucous membrane of the stomach which so often arises during the course of Bright's disease, does not seem to create any marked predisposition to tubercular mischief; while the severe changes in the stomach, which are encountered after death from pulmonary tuberculosis, are themselves the result and never the cause of the lung disease.

Although it must be admitted that, under ordinary circumstances, chronic disease of the stomach does not directly conduce to tubercular infection, it is by no means improbable that a sudden and complete failure in the functional activity of the digestive organs might be followed by phthisis. In this connection the following cases are extremely interesting.

CASE I.—A potman, 34 years of age, was admitted into the London Hospital on October 6th, 1888, with the symptoms of acute irritant poisoning, having swallowed some oxalic acid about an hour previously.

After the administration of the usual remedies the state of collapse gradually passed off, but the patient complained of a burning pain in the epigastrium with constant retching. During the next 24 hours the pain and vomiting continued severe, and on several occasions the ejecta contained traces of blood. On the third day an attack of melæna ensued, and this symptom recurred on two subsequent occasions.

For a fortnight after taking the poison the patient continued to exhibit the symptoms of severe inflammation of the stomach, violent attacks of pain and vomiting occurring upon every attempt to swallow nourishment.

On November 5th, nineteen days after the commencement of

the disease, it was noted that the patient had only been sick twice during the preceding 48 hours, and could now retain small quantities of liquid food. There was considerable pain over the region of the stomach, increased by pressure with the hand.

On November 10th, the vomiting again became urgent, the ejecta consisting of an exceedingly sour-smelling fluid which contained a large quantity of lactic acid, but appeared devoid of any trace of free hydrochloric acid. Numerous *sarcinæ*, *torulæ*, and bacteria were detected in it by the microscope.

One month after admission it was noted that the patient vomited once or twice a day, about 20 oz. of sour fluid, devoid of any trace of free hydrochloric acid, being rejected on each occasion. There was still considerable pain experienced in the epigastrium after taking liquid food. The stomach was found to extend one inch below the navel, and pressure over the pyloric region gave rise to pain.

A fortnight later, on November 27th, the dilatation of the stomach was found to be more apparent, and the vomit measured about 70 oz. daily.

By December 10th, the patient was sufficiently recovered to leave his bed for a few hours. He could now take small quantities of bread and milk, and such-like food without vomiting, but the more solid kinds gave rise to immediate pain in the stomach and were soon rejected. The body-weight, which on admission was said to have exceeded $10\frac{1}{2}$ stone, was now only 7 stone—a loss of rather more than 3 stone in two months. The temperature of the body remained at a point somewhat below the normal; the tongue was flabby and indented by the teeth, and the bowels obstinately confined. The stomach was now found to extend for $2\frac{1}{2}$ inches below the umbilicus, and to present a well-marked splash which was audible to the patient himself when he turned over in bed. Under these circumstances it was determined to wash out the organ with warm water, the operation being performed by means of a glass funnel and a soft tube. The daily employment of lavage, combined with careful feeding, soon brought about a rapid improvement in the general condition of the case.

A month later body-weight had increased by seven pounds. The patient still complained of attacks of severe pain in the

epigastrium, which occurred at irregular intervals and were always aggravated by the ingestion of food. The vomiting had diminished in severity, and several days sometimes elapsed between the attacks. On pumping air into the stomach by means of a hand-bellows, the organ was found to extend two inches below the navel. No trace of free hydrochloric acid could be detected in the fluid which was extracted.

On January 25th, 1889, the patient complained of feeling chilly and thought he had caught a cold while walking in the garden.

The following week it was noted that the man was not so well. He now suffered from cough accompanied by expectoration, and at night time his rest was disturbed by profuse perspirations.

The temperature, also, which previously had remained constantly below the normal point, now registered 101° F. in the morning and as much as 102.5° F. at night. The vomiting had again become troublesome, and the steady increase in the body-weight was not maintained. The physical signs in the chest denoted the existence of some general bronchitis.

A fortnight later the weight had decreased by seven pounds. The patient was very weak and troubled by constant cough and expectoration. Comparative dulness on percussion was discovered at the right apex, and numerous moist sounds were audible on inspiration.

From this time onward the pulmonary condition rapidly developed. At the beginning of March the upper part of the right lung was comparatively dull as far down as the fourth rib, while an impaired note at the left apex and right base posteriorly, with abundant crepitations on auscultation, gave evidence of the widespread character of the disease. On March 8th the patient had a sharp attack of hæmoptysis, and the expectoration was found to contain a large number of tubercle bacilli. The temperature seldom declined below 102° F. and frequently registered 104° F. Along with the development of the pulmonary disease the gastric condition had become worse. Vomiting now occurred frequently and the violent attacks of abdominal pain required the constant exhibition of morphine. The patient's strength rapidly failed, and he eventually succumbed to extreme exhaustion on April 5th, 1889, rather less than six months after

taking the oxalic acid, and about six weeks after the first appearance of the pulmonary symptoms.

At the post-mortem examination the lungs were found to be the seat of an acute tuberculous process which involved their whole tissue from apex to base. In the upper lobe of the right lung there was a cavity the size of a walnut. The stomach was greatly dilated and contained 54 ozs. of fluid. In the cardiac and middle zones of the organ the mucous membrane exhibited a peculiar glistening appearance, and was firmly adherent to the muscular coat, the whole wall of the viscus being remarkably thin and transparent. Radiating over the surface were a number of fibrous bands of the nature of superficial cicatrices. The mucous membrane in the pyloric region was considerably thickened and presented the features of the *état inamelonné*. The pyloric orifice had been narrowed by the thickening and contraction of the tissues in its neighbourhood, and would only admit the passage of a small catheter. On microscopic examination the mucous membrane over the cardiac two-thirds of the organ was found to have been converted into a layer of fibrous tissue a few lines in thickness, in which no indication of its former structure could be detected. The other organs were normal.

CASE II.—A man, aged 32, came under treatment in May, 1886, for a chronic disorder of the stomach.

He stated that when abroad five months previously he had accidentally swallowed some nitric acid, and had been immediately seized with great pain in the abdomen and vomiting. As the result of this accident he had been obliged to keep his bed for many weeks, and was unable to take any form of nourishment by the mouth without vomiting.

He now complained that whenever he attempted to swallow solid food it appeared to stick in the gullet and gave rise to pain in the lower part of the chest on the left side. When he swallowed fluids the liquid seemed to trickle slowly into the stomach past some obstruction, but if he attempted to drink quickly the major part of it regurgitated at once. Even when the food did reach the stomach it invariably caused considerable pain and was often vomited. On several occasions at the commencement

of his illness the vomit had contained blood. Before the accident he had always enjoyed excellent health, and as far as he knew none of his family had suffered from phthisis.

On examination the patient was found to be extremely emaciated and very anæmic. The pulse was small and feeble, the temperature of the body 97° F.; and the tongue covered with a thick white fur. The breath was very offensive. The stomach showed signs of considerable dilatation, and the lower margin extended two fingers' breadth below the umbilicus. The peristaltic movements of the organ were faintly visible through the abdominal wall, and a well-marked splash was obtained on manipulation. The whole of the epigastric region was tender on pressure. The other organs were normal.

The distinct history of corrosive poisoning coupled with the symptoms and physical signs just narrated, appeared to point to a slight constriction at the lower end of the œsophagus with chronic gastric catarrh and stenosis of the pylorus. It was accordingly determined to wash out the stomach every day, and to administer food regularly by means of the tube.

On attempting to pass a soft tube some resistance was encountered at a spot 42 centimeters from the incisor teeth, but this was easily overcome and the organ thoroughly washed out. The fluid extracted during the operation was yellowish-brown in colour and exceedingly sour-smelling. It contained a large quantity of lactic acid but appeared devoid of any free hydrochloric acid. Lavage was subsequently performed daily and the patient soon learnt to accomplish it for himself. The effect of thus keeping the stomach clean and administering food through the tube soon became apparent; the pain and vomiting gradually lessened in severity and the patient rapidly gained in weight.

Three months later the patient was found to have increased his weight by more than a stone. He still complained of attacks of pain in the region of the stomach which were aggravated by the ingestion of food, but the vomiting was much less troublesome. On examination the epigastrium was found to be tender, especially in the region of the pylorus. The stomach showed signs of considerable dilatation, and on being distended with air the lower margin was found to reach several inches

below the navel. No free hydrochloric acid could be detected in its contents. Six weeks later (nine and a half months after swallowing the acid) the patient expressed himself as feeling much worse. For a fortnight he had been troubled with a severe cough and expectoration, and had lost several pounds in weight. At night-time, also, his sleep was disturbed by profuse sweatings, and each paroxysm of the cough brought on an attack of vomiting with severe epigastric pain. The temperature now registered 102° F., the pulse was quick, and the patient appeared to suffer from dyspnœa. The great curvature of the stomach was found to extend as low as a spot midway between the umbilicus and the pubes, and presented a loud splash. The percussion note over the upper part of the left chest was comparatively dull as far as the fourth rib, and coarse moist sounds were audible over this area. The percussion note was also defective over the right base posteriorly, and numerous rhonchi with occasional râles were scattered over the whole chest.

From this time onward the pulmonary phenomena pursued an acute course. Tubercle bacilli were demonstrated in the expectoration, the gastric symptoms became greatly aggravated, and the patient died seven weeks after the first appearance of the phthisical symptoms, and rather more than ten months after taking the nitric acid.

At the autopsy both lungs were found to be studded with caseous tubercle, which in many places had already broken down into small cavities. The stomach was enormously distended and occupied the greater part of the anterior aspect of the abdominal cavity. At the lower end of the œsophagus the mucous membrane showed evidences of longitudinal scarring, and about one and a half inches from the cardiac orifice the tube was distinctly dilated and its walls thickened; while just above its termination there existed a cicatrix involving one quarter of the circumference of the tube and causing considerable narrowing of its lumen.

The stomach contained a large quantity of fluid and gas. In the fundus of the organ the mucous membrane had undergone post-mortem digestion, but elsewhere the whole of the secreting surface was found to have been completely destroyed, and a thin layer of fibrous tissue was all that remained to represent

the mucous membrane. Close to the pylorus, and situated on the lesser curvature, there was a chronic ulcer the size of a florin. The edges were very thick and irregular, and the base was formed by the muscular coat of the organ. The contraction of the edge of this ulcer had caused a puckering of the neighbouring tissues, and so contracted the pyloric orifice that it could only admit the introduction of a lead pencil. The other organs were normal.

M. Robert, of Paris, gives the details of a case, the main features of which are precisely similar to the preceding.*

The patient, a man 32 years of age, was attacked with the symptoms of severe inflammation of the stomach after swallowing some nitric acid. The organ became greatly dilated and he suffered from several attacks of hæmatemesis. At the end of ten months he was suddenly attacked with a cough and rapidly developed all the symptoms and signs of acute phthisis. Six weeks later he succumbed to pneumothorax. At the necropsy a chronic ulcer was found at the pyloric end of the stomach causing contraction of the orifice. Elsewhere the inner surface of the organ presented a smooth, shining appearance, with cicatricial bands radiating in all directions. Both lungs were profusely studded with the so-called broncho-pneumonic tubercle, and a small cavity in the left upper lobe had ruptured into the pleural sac.

The three cases just related are almost identical in their pathological and clinical features. In each instance a corrosive fluid had given rise to severe inflammation with subsequent destruction of the mucous membrane of the stomach. Although none

* "Bulletins de la Soc. Anat." 1880, p. 309.

of the patients possessed any family tendency to the inception of tubercle, in each case the pulmonary disease commenced suddenly and ran an extremely acute course.*

From these facts it would appear probable that a sudden and complete destruction of the digestive functions of the stomach might so lower the general nutrition of the system as to predispose it to an attack of an acute infective disease like tuberculosis, which, owing to the exhausted condition of the patient, would be able to run a rapid course.

* "Clin. Soc. Trans.," 1894.

CHAPTER IV.

THE DYSPEPSIA OF STRUMOUS CHILDREN.

THE profession is indebted to Dr. T. J. Todd* for the recognition of a variety of dyspepsia which is directly associated with the strumous diathesis. A few years after the publication of Todd's memoir, Sir James Clark† again drew attention to this important subject, and not only fully confirmed the original description of the disorder, but even went so far as to assert that the gastric derangement was the most constant and typical feature of the scrofulous habit.

Of late years the complaint has attracted but little notice, and modern writers are content either to quote the opinions of the last named observer, or to dismiss the question with the brief remark that dyspepsia is often encountered in strumous subjects.

My attention was first directed to this disorder two years ago, by the case of a young lady who was brought to me on account of violent attacks of abdominal pain, associated with symptoms of a deranged digestion, and since that time I have seen many instances of a similar nature. The complaint is encountered in a modified form in almost every child who presents the general features of the tuber-

* "Cyclopædia of Practical Medicine," Art., *Indigestion*, 1833, vol. ii., p. 649.

† "Pulmonary Consumption," 1835, p. 16.

cular diathesis, but it is comparatively rare for the disorder to prove so severe as to claim the exclusive attention of the practitioner. I find that among 2,000 cases of disease in children which have come under my care during the past twelve months at the Evelina Hospital, 32 were brought to me solely on account of the complaint in question, and it is from observations made on these cases that the following remarks have been compiled.

Sex and Age.—Girls appear to be much more subject to the complaint than boys, for among my 32 cases no fewer than 26 were of the female sex. The disorder may exhibit itself at any time between the fourth and fourteenth year of life, but it is most common about the age of five or six. In only two of my cases the child had reached its twelfth year before the complaint came on, but I have seen a well-marked example of the disease in a girl of seventeen.

Family History.—In the vast majority of the cases the patient exhibits a strong family tendency to tuberculosis. Thus in 22 instances (66 per cent.) it was found that one of the parents had suffered from phthisis, and it is curious to observe that in no less than 70 per cent. of these it was the father who was the subject of the pulmonary complaint. In one-third of the cases it was stated that one or other of the grandparents had also suffered from the same disease.

Family predisposition to acute rheumatism was encountered in two cases, and in three others "rheumatic gout" was said to exist in some near relative. In one instance a sister had suffered from chorea, but with this exception the cases which have come

under my observation were free from any neurotic taint. Todd believed that the offspring of old men were particularly prone to fall victims to this variety of dyspepsia, but this observation I have not been able to confirm.

As a rule one or more members of the patient's family exhibit evidences of the strumous diathesis. In 12 cases I found that one of the other children was the subject of enlarged cervical glands, or possessed scars or other signs of disease of the lymphatic system or the bones.

General Appearance.—The digestive disorder affects all varieties of the so-called scrofulous temperament, but the children who possess the finer and more delicate caste of features prove the most frequent sufferers.

In addition to the general appearance indicative of the strumous diathesis some local manifestation of scrofula is occasionally encountered. Chronic enlargement of the cervical or sub-maxillary glands was only noticed in 2 cases, but in 3 others typical scars were observed. Chronic inflammation with hypertrophy of the tonsils existed in 10, and phlyctenular ulcers of the cornea in 5 cases, but tubercular disease affecting the long bones or joints was never noted. Otorrhœa was present in 6 instances, and many of the children suffered from muco-purulent discharges from the nose or vagina without any obvious disease being detected in these organs.

Anæmia was an invariable symptom, and the digestive derangement seldom underwent any decided improvement until the conjunctivæ and the mucous membranes began to regain their normal colour.

Symptoms and Progress.—Pain in the abdomen constitutes one of the most constant and characteristic features of the disease. It is usually quite sudden in its onset and is apt to occur at irregular intervals. When the child is seized with the pain during the course of the day, it may be noticed suddenly to cease its play and to clasp its hands over the abdomen, while not unfrequently it will throw itself on the ground and appear to writhe in agony. Should the attack occur during sleep, the patient awakes with a scream and jumps up in the bed with an expression of the greatest possible alarm on her features. Sometimes the face becomes blanched before the pain comes on, and the sudden pallor is sufficient to warn the nurse of the approach of an attack; in other cases the face is deeply flushed, the conjunctivæ injected, and beads of sweat appear on the forehead and neck.

As a rule the attack occurs during the early part of the evening or night (7-9 o'clock), but occasionally its advent is postponed until two or three in the morning. The majority of the cases also suffer from a recurrence of the symptom during the course of the day, especially just before breakfast and about noon. In 23, or about 69 per cent. of my cases the ingestion of food was also followed within a few minutes by an attack, and the patient was often obliged to hurry off to the closet owing to a sudden and urgent call to relieve the bowels.

The umbilical region is the part of the abdomen to which the pain is usually referred, though occasionally other districts are also affected. The symptom partakes of the nature of a twisting or cutting sen-

sation, and it frequently appears to commence a little to the right and slightly above the umbilicus and to proceed transversely across the abdomen from right to left. Occasionally, however, the patient has assured me that the pain travelled in the reverse direction or remained situated in the hepatic or splenic region. In two cases the hypogastrium was indicated as the chief seat of the suffering.

The pain may prove severe from the very commencement of the attack, but it generally grows more and more intense until a maximum is attained, after which it gradually declines. Sometimes the expulsion of a large quantity of gas either by the mouth or the rectum is followed by more immediate relief.

The actual duration of the pain varies from five minutes to several hours. The nocturnal attacks are the most severe and endure the longest; but when the disease is becoming cured their duration is much curtailed, and they are eventually replaced by a mere momentary twinge.

The affected region of the abdomen is sometimes slightly tender on pressure, but more commonly firm manipulation affords relief, and very often the child will spontaneously press both its fists, or even the corner of a chair into the abdomen when the seizure occurs.

There are certain conditions which appear to favour or even excite an attack of this nature. Constipation is a frequent concomitant symptom of the disease, and it is usually noticeable that the pain is aggravated by the presence of an overloaded colon. When the attacks follow the meals they occur quite irrespective of the quantity of nourishment which

may have been taken, but warm liquids or spiced foods are more active in the production of the symptom than other varieties.

Exhaustion from want of food appears to be a frequent cause of an attack, and it is probable that the habit of sending children to bed with the stomach empty is responsible to some extent for the extreme frequency with which the pain occurs at night. In these cases I am now in the habit of ordering some bread and milk to be administered shortly before the patient retires to rest, and I have often observed the pain either diminish or even disappear altogether by the adoption of this simple procedure. The same remark applies to that variety that is so apt to occur just prior to the breakfast or dinner hour.

Physical fatigue is also an important factor in the causation of the symptom, and in one well-marked example the prohibition of an hour's exercise with the skipping rope in the evening was at once followed by the subsidence of the nocturnal attacks.

In a few cases mental exhaustion resulting from over study appeared to determine the onset of the symptom, and in one obstinate case where the attacks occurred on the same night each week, it was found on enquiry that the child had to accomplish a considerable amount of arithmetic before going to bed on that evening, a task which always proved extremely wearisome. As soon as this fault was remedied rapid improvement took place, and the pain eventually disappeared.

The condition of the appetite varies considerably. Todd and Clark found that the desire for food was often insatiable, and this I have also occasionally

observed. As a rule, however, the appetite is poor and exceedingly capricious, and the child is apt to develop peculiar distastes for certain articles of food. Meat-fat is particularly repugnant to many of these patients, and I found that no fewer than 87 per cent. of my cases were unable to eat this substance without experiencing nausea, acidity, vomiting, or an attack of "biliousness." This dislike is sometimes so intense that the mere sight of fat gives rise to a feeling of nausea. Bacon fat, on the contrary, is often eaten with pleasure, and milk, cod liver oil, and glycerine are easily tolerated.

As a rule children are extremely partial to sweet things, but 30 per cent. of my cases of this disorder disliked sugar in any form, and the mother usually stated that saccharine substances made them "bilious."

In a few instances the statement was volunteered that the child disliked the ordinary kinds of food, but was very fond of indigestible materials. Enquiry into this subject generally elicited the fact that all sour and acid substances were regarded as special dainties. Thus in one case a mother complained that her daughter had ruined her digestion by extreme indulgence in vinegar, while in another the child was said almost to subsist upon lemons. These facts are interesting, since the same tastes are often exhibited by patients suffering from the dyspepsia of early phthisis (Chap. VI.).

Thirst usually constitutes a prominent feature of the disorder and was present in 63 per cent. of my cases. The sensation is chiefly complained of at night, and the child will often get out of bed and

search for water to drink ; and in one instance I was informed that the dirty contents of the hand-basin had been imbibed in the absence of drinking water from the room. Occasionally the thirst persists all day, and in these instances the appetite is generally very defective.

Constipation was complained of in 22, or 67 per cent. of the entire number. In some cases the torpid action of the bowels had existed throughout life, but as a rule the symptom had only shown itself for the first time shortly before the onset of the pain. The stools are pale and fœtid and usually consist of a kind of putty or mortar-like substance ; but occasionally they are hard and knotty ; or they may present the appearance of slime. On careful examination the evacuated material is found to contain a large quantity of unaltered food but very little bile pigment, appearances which seem to justify a frequent observation of the nurse to the effect that the food "goes through the body unchanged." Not unfrequently a fœtid discharge occurs from the rectum, and occasionally small quantities of pure blood may be voided. I have never been able to discover the presence of hæmorrhoids or any other disease of the rectum to account for these symptoms, which usually disappear spontaneously as the case improves.

In 10 cases, or about one-third of the entire number, the bowels were stated to be irregular in their action. In many of these it was a constant complaint that as soon as a few mouthfuls of food had been swallowed the child was attacked with pain in the abdomen and had to hurry away in order to pass a motion. This sequence of events ensued after

every meal and was a cause of great annoyance both to the patient herself and to her parents. The evacuations in these cases are usually semi-solid in character, but sometimes they are liquid, and frequently give rise to a sensation of heat or scalding at the anus, or are accompanied by tenesmus. Occasionally the abdominal pain subsides without an evacuation of the bowels. Hot liquids or spiced foods appear to excite the peristaltic action of the intestines most readily, but sometimes the ingestion of fat meat is held by the patient to be responsible for the sudden diarrhœa. Under ordinary circumstances *nausea* and *vomiting* are seldom complained of, and *flatulence* and *acidity* are equally rare.

Although there may be no actual loss of flesh the child remains thin and anæmic and never seems to gain ground. The skin feels harsh and dry, but profuse perspirations are apt to occur during the night. The hands and feet are habitually cold and blue in colour, and are liable to chilblains. Sleep is much disturbed by dreams, and the child often talks wildly, gesticulates, or grinds the teeth while it dozes. The urine is usually pale in colour and may deposit a considerable quantity of phosphates. The tongue is generally clean and of a darker red than normal, but occasionally it appears to be veiled by a thin coating of white fur, through which the papillæ can be discerned in the form of vivid red spots.

From time to time these symptoms are apt to be replaced by others arising from an attack of subacute gastritis. When this disorder supervenes the child usually awakes in the morning with frontal headache

and a foul taste in the mouth, and complains of extreme nausea. The appetite is in complete abeyance but thirst is usually excessive. The face appears pale and puffy and dark lines present themselves beneath the eyes. The breath is sour and the dorsum of the tongue covered by a thick yellow fur, while the tip and edges are bright red in colour. Occasionally small patches of aphthous ulceration appear on the gums and palate, and give rise to considerable discomfort. The pulse may be slightly quickened and the temperature of the body raised a point or two above the normal, but the degree of pyrexia is usually insignificant. Nausea is a constant symptom, and retching or vomiting follows every attempt to partake of food. Acidity and flatulence are occasionally encountered. As a rule diarrhœa complicates the gastric disorder, but in some instances constipation occurs. The urine is passed in diminished amount, and deposits a quantity of amorphous urates.

These catarrhal attacks are apt to occur every few weeks and generally last from two to five days. Occasionally I have noticed a sudden change in the atmospheric conditions to be followed by an attack, especially when damp and mild weather has set in after a spell of dry north-east winds. In a few cases certain articles of diet have appeared to be responsible for the attack, and I have several times heard it stated that a small quantity of fat which had been eaten was the cause of the "biliousness."

After the age of puberty the various symptoms of the complaint usually subside, but the patient may still be subject to occasional attacks of gastric

catarrh. In some instances, however, the disease slowly undergoes a form of evolution, and the stomach rather than the intestine becomes eventually the chief seat of the disorder. In these cases it is sometimes possible to trace the gradual development of that peculiar variety of dyspepsia which forms the subject of the next chapter.

Etiology.—In the absence of post-mortem evidence it is only possible to offer a general surmise concerning the origin of the various symptoms of the complaint.

Todd considered that the dyspepsia was caused by a deficient secretion of the bile whereby the processes of digestion and assimilation of the food in the duodenum were permanently hindered. Although there can be no doubt that this explanation is partially correct, since the general appearance of the patient, and the pale and fœtid condition of the stools, clearly indicate the existence of a defective biliary secretion, there are reasons for believing that the liver is not the only organ which is at fault. The peculiar situation and character of the abdominal pain suggest that this symptom arises from an irregular and spasmodic contraction of the colon, a supposition which is confirmed by the fact that in many cases the pain is immediately followed and relieved by an evacuation of the bowels. But unlike ordinary cases of colic the symptom does not seem to arise from the ingestion of irritating materials, nor does it depend entirely upon an overloaded state of the colon. On the contrary, it is most readily excited by such conditions as mental or physical exhaustion which exert their action through the medium of the central ner-

vous system, or by a process of reflex irritation, as when food is introduced into the empty stomach. The sudden and violent peristalsis which is brought about in these various ways tends to curtail the period of gastric as well as intestinal digestion, and to hurry the food through the bowel before it has had sufficient time to undergo the necessary chemical changes.

It is well known that the tubercular diathesis is closely associated with various forms of neurosis, and it is therefore not unreasonable to suppose that the subjects of this disorder may occasionally exhibit an extreme irritability of the nervous mechanism of the digestive tract, which may show itself in the form of sudden and painful peristaltic waves. I am, therefore, inclined to regard the dyspepsia which is prone to attack strumous children as a motor and sensory neurosis of the gastro-intestinal tract, rather than a functional disorder of the stomach.

Treatment.—The predisposition to tuberculosis exhibited by these cases requires the adoption of special precautions with the view of maintaining the general health. The child must always be warmly clad and exposure to cold and damp carefully avoided. As a rule flannel or woollen clothing should be habitually worn next the skin, and at night time a flannel suit may be advantageously substituted for the cotton or linen garment. Tepid baths of salt water are always useful in maintaining a healthy action of the skin, and regular but not excessive exercise in the open air should be encouraged.

Sea air is particularly beneficial in the treatment of these cases, and a few months' residence at Mar-

gate, Ramsgate, Dover or some other health resort on the east or south-east coast is often followed by marked improvement. The more relaxing atmosphere of the south of England, on the other hand, is seldom suitable for the subjects of this disorder, owing to the tendency to gastric catarrh or biliousness which the climate appears to induce.

The selection of an appropriate dietary seldom presents much difficulty. All articles of food which contain a large percentage of indigestible material should be avoided, and hence vegetables should be given sparingly or withheld altogether. White fish, chicken, and tender meat are to be preferred to the coarser and richer varieties, and all condiments and highly spiced foods should be forbidden, on account of the excessive peristalsis which their ingestion is apt to engender.

Milk and cocoa may be given freely, but coffee and strong tea must be prohibited. Alcohol is seldom required, and the constant resort to brandy as a means of relieving the pain is strongly to be deprecated. When improvement has set in, a little bitter ale or stout at meal times is often of service, but these beverages seldom agree in the early stages of the complaint.

The meals should be taken at regular hours, and it is often wise to administer some bread and milk, tapioca, gruel, or other light food about half an hour before the child retires to bed.

The most prominent indication for medicinal treatment consists in the regulation of the bowels. Todd recommended the administration of small doses of grey powder for this purpose, followed by a course of

mild hepatic stimulants, such as rhubarb, taraxacum, and nitrate of potassium. From my own experience I am inclined to regard these remedies as being chiefly of value when the tongue is thickly coated and nausea is a prominent symptom. As a rule, I have found the extract of cascara sagrada by far the most reliable drug in the treatment of the constipation, and usually commence by the administration of ten to fifteen minims of the liquid extract along with a drachm of maltine, night and morning. Occasionally small doses of aloine and nux vomica answer well, or some simple laxative such as the confection of senna and sulphur, or the compound liquorice powder may be employed with advantage.

Drastic and saline purgatives had better be avoided since the exhaustion which is apt to ensue from their employment increases the tendency to attacks of pain.

When the bowels are moved at each meal sedatives should be administered to relieve the extreme irritability of the intestine, and small doses of nepenthe, compound tincture of camphor, or a solution of morphine may be given in combination with carbonate of bismuth or aromatic sulphuric acid. In other cases the compound ipecacuanha or opium powder may be substituted for the sedative draught.

As soon as the bowels have been brought into a satisfactory condition an attempt should be made to improve the quality of the blood, for as long as anæmia persists the disease is seldom amenable to treatment. The tartrate, carbonate, and ammonio-citrate of iron are to be preferred to the other preparations, and occasionally the exhibition of the drug in the form of the compound iron mixture of the pharmacopœia is

attended by success. The medicine must be administered after the meals, and a few drops of the tincture of *nux vomica* may be added to it after a time, should the appetite remain poor.

Cod-liver oil is seldom of much use in the early stage of the disorder, but as soon as the pain has subsided it may be cautiously employed, and the dose gradually increased. If the crude oil produces nausea the Kepler malt extract with cod-liver oil is often of extreme value.

When the symptoms of gastric catarrh present themselves the child should remain in doors and, if necessary, be confined to bed. The diet should consist entirely of milk, milk and soda water, beef-tea, thin soup, bovril, or beef essence. Small doses of mercury and chalk may be administered every evening for two or three days, followed the next morning by some saline purge. At a later period an alkaline medicine, with or without rhubarb or taraxacum, may be given once or twice during the course of the twenty-four hours.

If the digestion remains in a feeble state after the attack has passed away, the exhibition of the mineral acids is usually of service.

CHAPTER V.

A VARIETY OF DYSPEPSIA WHICH IS APT TO PRECEDE THE DEVELOPMENT OF PULMONARY TUBERCULOSIS.

WILSON PHILIP* (1826) appears to have been the first to draw attention to the fact that many cases of phthisis are preceded for some time by severe indigestion. In 1833, Todd,† in an excellent article upon indigestion in the "Cyclopædia of Medicine," referred to a form of dyspepsia, which, according to his experience, was often followed by laryngeal or pulmonary tuberculosis, and even went so far as to assert that the cachectic condition induced by this functional disorder of the digestive organs was the exciting cause of the tubercular disease. Two years later, in 1835, Sir James Clark‡ strongly endorsed the opinions of Todd, and regarded a variety of dyspepsia which sometimes occurred in persons of a scrofulous habit as the forerunner of the lung disease. Similar statements are also to be found in the writings of Budd,§ Bennett|| Ansell¶ and others.

In 1854, Mr. Hutchinson** published an elaborate

* "Treatise on Indigestion," 1826, p. 323.

† "Cyclop. of Practical Medicine," 1833, vol. ii., p. 649.

‡ "Pulmonary Consumption," 1835, p. 16.

§ "Diseases of the Stomach," 1855.

|| Art., *Phthisis*, Reynold's "System of Medicine," vol. iii., p. 537.

¶ "Treatise on Tuberculosis," 1852.

** "Medical Times," 1855, i., p. 583.

article dealing with a form of dyspepsia which frequently preceded the development of phthisis, and in it he stated that, in about 60 per cent. of his cases of phthisis, indigestion had been a prominent symptom prior to the onset of the lung complaint. These results were confirmed shortly afterwards by Dobell* and Fenwick.† Lastly, in the second edition of his book on "Diseases of the Stomach," (1864), Brinton‡ devotes an entire chapter to the consideration of the so-called "gastric phthisis," and comes to the conclusion that "in some cases it is fair to infer that the dyspepsia causes the phthisis, which in point of time it certainly precedes and ushers in."

During the last thirty years the subject has attracted but little attention in this country, while many Continental physicians have shown an inclination to regard this variety of dyspepsia with a considerable amount of scepticism, and appear to consider the original description of the disorder a result of incorrect observation.

But if this explanation is to be accepted, it is obvious that the clinicians of the first half of the present century were either deplorably ignorant of the physical signs of phthisis, or else that one after another they were led to describe a disease which had no existence except in their own imaginations. Considering, however, that the authorities in question were some of the shrewdest and most celebrated physicians of the century, there can be little doubt that there existed sound reasons for their belief in the

* "Lancet," 1864, ii., p. 288.

† "Diseases of Stomach and Duodenum," 1868, p. 189.

‡ "Diseases of the Stomach," p. 340.

reality of the complaint. For my own part I am quite convinced that there does exist a variety of dyspepsia which is peculiarly apt to be followed by pulmonary tuberculosis, and have little doubt that everyone who has had much experience either in pulmonary or gastric diseases will endorse this opinion.

General Sketch.—The cases of this description may be roughly divided into two classes, in one of which the symptoms are chiefly those of weak digestion, while in the other the dyspepsia assumes a more irritable type, characterised by severe pain and vomiting. Each variety is worthy of attention, and will be considered separately.

1. *The Atonic Variety.*—The subjects of this class are usually young females from 13 to 25 years of age, and the first symptoms are very apt to date from the convalescent period of some acute febrile disorder, such as enteric fever, scarlatina, or measles. In such cases the gastric disease often commences with an attack of subacute catarrh of the stomach, characterised by severe pain at the epigastrium after food, with nausea, vomiting, thirst, and loss of appetite. If the complaint begins in a more insidious manner, it is the general failure in strength and bodily tone which chiefly attracts the attention of the patient and her friends, and occasion the remark so often heard that “the girl has never been herself since the fever.” When the disease has become established, the patient usually complains of constant pain or uneasiness at the epigastrium after the meals, though occasionally the sensation may prove more severe and be referred to the iliac or hypogastric regions rather than to the vicinity of the stomach. The appetite is weak and

often extremely capricious, and in the majority of cases the patient acquires a morbid dislike for certain articles of diet, notably those of the hydro-carbon class. Meat-fat of every kind constitutes the chief aversion, and a patient who prior to her illness was accustomed to eat a fair proportion of fat with each meal, will now express the utmost dislike for it, and may refuse to touch any kind of oily material or even butter. Nausea is a frequent symptom, and flatulence is apt to prove troublesome. The bowels are invariably confined, and the obstinacy of the constipation generally proves one of the most noticeable features in the case.

When the abdominal symptoms have subsided under treatment, the general condition of the patient still remains in an extremely unsatisfactory state. She is pale, thin, and languid. The slightest physical or mental exertion induces an attack of exhaustion or depression, during which the gastric phenomena reassert themselves, and she mopes about the house in a listless and desponding manner. The appetite is usually bad, though occasionally it proves ravenous, but the ingestion of a large quantity of food is apt to be followed by the return of the previous symptoms, or by an attack of gastric catarrh. The tongue is large, pale and flabby; the breath sour and offensive, and the front teeth show a tendency to rapid decay. The limbs feel habitually heavy and tired, and the hands and feet are cold and subject to sudden and profuse perspirations. The face is pale and puffy, and dark lines under the eyes increase the general appearance of ill health. The pulse is small and feeble, and the temperature of the body slightly

below the normal point. The bowels are obstinately confined; the stools hard, clay coloured, and very offensive, and often contain an excess of mucus with masses of undigested food. The urine is voided at rare intervals, is usually neutral or alkaline in reaction, and sometimes deposits a large quantity of phosphates or oxalates. The patient complains neither of cough, pain at the chest, nor night-sweats, nor does she lose flesh quickly. The sleep is often disturbed by horrible dreams, the remembrance of which tends to augment the state of mental depression. In this condition the girl may remain for many months, or even years, never feeling strong, yet unable to ascribe her symptoms to any cause other than the disorder of digestion. The catamenia are scanty or irregular, and often fail to make their appearance at all, to which latter circumstance the friends are usually inclined to attribute the whole series of symptoms.

In the course of time, however, a change comes over the features of the case, and fresh symptoms begin to show themselves. The patient is noticed to have developed a dry cough, especially in the early morning, or she may occasionally decline to take any breakfast because she has been sick while dressing. The appetite becomes more and more fickle, the pain at the epigastrium more troublesome, and emaciation now makes rapid progress. The pulse is quickened, night-sweats make their appearance, and the temperature shows a slight elevation towards evening. After a short time comparative dulness, with crepitation, is discovered at one apex, and the case gradually slides into well-marked phthisis of a chronic type.

2. *The Irritable Variety.*—The other variety of dyspepsia is most prone to attack men from 25 to 40 years of age, who possess a tall and spare physique, a highly nervous temperament, and sometimes more than the average amount of energy and mental ability. In many instances there exists a strong family tendency to tuberculosis; but in others no such history can be obtained.

Without any obvious exciting cause the victim of this complaint begins to experience an uneasy sensation at the epigastrium after a meal, which presently assumes the character of actual pain. At first it may be only the first meal in the day which gives rise to discomfort, and the symptom disappears during the course of the morning. Soon, however, pain ensues after the other meals, and finally every attempt to take food is followed by a recurrence of this symptom. When the disease has made some progress, a feeling of sickening depression often follows the establishment of the pain, and flatulence accompanied by acid eructations add to the general discomfort. The appetite rapidly diminishes, and certain articles of food, such as fat or sugar, which had been previously eaten with pleasure and impunity, now create acidity and nausea, and are regarded with feelings of dislike or even of loathing. After the lapse of a shorter or longer interval of time, the dyspeptic attack culminates in vomiting, which, although it may temporarily relieve the more prominent symptoms, tends to produce extreme exhaustion. When this stage has been reached the general condition of the case undergoes steady deterioration. The patient becomes irritable and de-

pressed, and is the subject of the gloomiest forebodings. The appetite varies from day to day, being at one time almost ravenous, at the next either completely absent or even replaced by a distinct aversion to food of all kinds; while not unfrequently a strong desire for food suddenly vanishes as soon as a mouthful has been swallowed.

The tongue is pointed, deep red in colour, and often presents enlarged and injected papillæ at the tip. The bowels are usually constipated, but they may share in the irritable condition of the stomach, and obstinate constipation is then apt to alternate with attacks of acute diarrhœa during which the dyspeptic phenomena show signs of aggravation. Frontal or vertical headache or some neuralgic affection of the face is frequently present, and the patient is apt to complain of a disgusting taste in the mouth and rapid rotting of the teeth. The skin is soft and perspiring, and great thirst is sometimes experienced, especially towards daybreak.

These cases levy a severe tax upon the patience and tact of the medical attendant. The highly nervous temperament of the patient, increased by the disorder from which he suffers, causes him to consult various medical books in the vain hope of discovering some remedy which may afford him immediate relief, and by almost every post he either puts fresh questions to his physician concerning the exact pathology of his complaint, or requires information respecting some new drug or article of diet which has attracted his notice. There is no cough, and the most careful examination of the lungs can discover no signs of disease; nevertheless it is a

curious and suggestive fact that the majority of the cases are perpetually craving to have the chest examined, and can only give as the reason for this apparently morbid desire, that they feel so extremely weak. The state of mind engendered by the complaint may closely resemble monomania or actual insanity, and I am acquainted with several cases of this kind which were for long diagnosed as hypochondriasis or malingering.

The progress of the disease is not always from bad to worse; for the gastric symptoms are apt to undergo a kind of remission from time to time, when the hopes of both patient and physician revive. Unfortunately in the majority of cases the remission is only of an extremely temporary nature, and the original symptoms eventually reassert themselves with increased virulence.

Sooner or later a sudden change for the worse occurs. The patient declares that he has caught a cold which he is unable to shake off, and a troublesome cough makes its appearance, accompanied by expectoration. Profuse perspirations occur both by day and night, the gastric disorder becomes greatly intensified, and on examination the signs of a somewhat extensive consolidation of one apex are discovered. The tuberculous disease spreads rapidly, and in a short time the other lung shows signs of infiltration. The temperature ranges high, and the patient succumbs to extreme exhaustion, with the signs of a rapid form of pulmonary tuberculosis.

After this brief outline of the two principal varieties of gastric derangement which appear to merit special attention from the fact that they are apt to

be followed by pulmonary tuberculosis, the various clinical features of the complaint may be considered in detail.

1. *Hereditary Predisposition*.—In many of the cases which exhibit the symptoms of *weak digestion*, no family predisposition to tuberculosis can be established. Occasionally, however, the patient himself or some of his near relatives may present the characteristic features of the strumous diathesis, either in their general appearance or by the possession of enlarged glands, joint disease, or some other form of chronic inflammation. The presence of these evidences of a constitutional disorder allied to tubercle bring the cases in question into close relation with that variety of dyspepsia which formed the subject of the previous chapter.

In the *irritable* variety of the disease, there is sometimes a complete absence of a tubercular taint, and the patient is unable to remember a single near relative who suffered from phthisis. But in these cases it is by no means uncommon to find that several members of the same family have suffered from a precisely similar form of indigestion, and I have known more than one instance where two children in a family became the subject of an extremely irritable variety of dyspepsia, and eventually succumbed to a rapid form of pulmonary tuberculosis.*

Frequency of Occurrence.—The relative frequency with which dyspepsia occurs as a premonitory symptom of pulmonary tuberculosis has been the subject of considerable discussion. Wilson Philip† thought

* This fact has also been noted by Clark and Brinton, *Op. cit.*

† *Op. cit.*

that "in the majority of cases dyspepsia precedes the lung disease" but in support of this statement he offered no statistical evidence. Later writers contented themselves with the general assertion that phthisis is frequently preceded or ushered in by severe indigestion. Hutchinson's* enquiries indicate that nearly 60 per cent. of all cases of phthisis are preceded by a peculiar form of gastric derangement, while Marfan† could only discover the existence of the complaint in 2 out of 61 cases, and Quenu‡ in 5 out of the 60 which he investigated.

This divergence of opinion on the part of the various writers may be attributed to several causes. In the first place the term "dyspepsia" is an exceedingly elastic expression, and many persons who believe themselves to be martyrs to the complaint are in reality suffering from some disorder quite unconnected with the stomach. Again, most of the statistics at our disposal have been compiled from the statements of persons who were already the subjects of advanced phthisis, and who consequently had to depend entirely upon their memory when they affirmed that the indigestion occurred before the development of the pulmonary phenomena. But, as Marfan justly remarks, the onset of the cough and other early symptoms of the lung disease, are extremely apt to be overlooked, and it is, therefore, impossible to accept as accurate any statements made by patients with reference to the priority in development of one symptom over another.

These various opinions, however, do not concern

* *Op. cit.*

† *Op. cit.*, p. 48.

‡ Cited by Marfan, *Op. cit.*, p. 48.

the varieties of dyspepsia which are at present under discussion, for they merely deal with the occurrence of indigestion as a premonitory sign of phthisis, and not with any particular variety of dyspepsia which exhibits a special tendency to terminate in tuberculosis. Although I can offer no decided statement on this point I am inclined to believe that the disease in question is comparatively rare, and is more frequently observed by specialists in diseases of the digestive organs than by those who devote their chief attention to the pulmonary complaint.

Disorders of the appetite.—It is a common observation that phthisical patients have an intense dislike to *fat*, but it is not so usually known that many of these cases develop this peculiar antipathy many months or even years before the onset of the pulmonary disease.

Among families which exhibit a marked predisposition to tuberculosis, it is not uncommon to find that several members possess a strong aversion to all forms of fat, and are often unable to partake of even a small quantity of this material without suffering from acidity, nausea, or an attack of biliousness. This fact was long ago commented upon by Hutchinson, who went so far as to affirm that it was often possible to predicate which members of a strumous family would eventually fall victims to tubercular disease of the lung, by a careful study of their powers of fat digestion. In other cases, the symptom is only developed at a later period of life; but whether it be lifelong or only recently acquired, difficult digestion and assimilation of fatty substances invariably constitutes one of the most constant and

noteworthy features of this form of dyspepsia. Thus Hutchinson* found that 71 per cent. of his cases were unable to take fat, while only 5 per cent. appeared to like it; and these observations have received ample confirmation. But the subjects of these enquiries were already suffering from tubercular disease, and since it is not uncommon to find that a certain amount of toleration to fat becomes established during the progress of the pulmonary complaint,† it is probable that antipathy to fat really exists more frequently than even Hutchinson's figures would seem to indicate.

Upon careful enquiry it is usually found that it is the fat of such forms of meat as pork, mutton, veal and beef which first disagrees; and a patient will often consume bacon, fresh butter, or oil without much difficulty, when he will carefully strip his meat of every particle of connective tissue, and pick out the minute pieces of suet from any pudding which he may happen to fancy. In advanced cases, on the other hand, the patient shuns every variety of oily material, and will consequently decline salad which has been dressed, sardines, and even the richer and oily forms of fish such as salmon and mackerel.

Distaste for fresh butter is less frequently encountered, though in some instances even this gives rise to unpleasant symptoms.

Besides the various fatty and oily substances, patients suffering from this form of dyspepsia occasionally acquire a dislike to the carbo-hydrates, and *starchy* or *saccharine* materials have to be withheld as far as possible from the dietary on account of the

* *Loc. cit.*

† See Chap. VII.

nausea and acidity which their ingestion produces. Sometimes *alcohol* is also found to disagree, although prior to the onset of the dyspepsia the patient was accustomed to indulge in wine or spirits with both pleasure and comfort.

A careful examination into the nature of this dislike for fat and sugar, appears to show that the symptom depends, not so much upon the immediate taste or appearance of these foods, as on the severe and disagreeable symptoms which experience has taught will assuredly follow any attempt to digest them. Thus, when a patient is asked if he likes fat, he immediately answers in the negative; but when pressed to explain the reason for his dislike, he usually states that the material in question either "turns sour on the stomach," "produces biliousness," or "makes him sick." One or more of these symptoms can often be observed in a case which has been persuaded to swallow a moderate quantity of fat by way of experiment. The material is hastily bolted with much expression of disgust, and within a few minutes the patient will complain of a rancid taste in the mouth of which he vainly endeavours to rid himself by spitting, or washing out the buccal cavity with water. No amount of local cleansing, however, will accomplish this object, and in a short time the discomfort becomes increased by the occurrence of acid or foul eructations, sometimes associated with a burning sensation at the epigastrium. To these symptoms nausea is usually super-added, and occasionally actual vomiting may occur, or the bowels may relieve themselves of a liquid motion.

From these facts it would appear that the intense

dislike to fat so uniformly exhibited by the subjects of this variety of dyspepsia, does not arise from any fanciful objection to this article of diet, but depends rather upon the fact that the material is prone to undergo some abnormal chemical change when introduced into the stomach, which renders it difficult of assimilation.

Pain.—In the *atonic* variety the patient seldom complains of actual pain; more commonly an uneasy sensation makes itself felt in the region of the stomach soon after each meal, or a dull, heavy weight appears to be situated over the lower end of the sternum. Sometimes the sense of discomfort gives rise to difficulty of respiration, or violent palpitation of the heart occurs; while in other instances a dragging or boring pain is experienced in the left shoulder or the upper dorsal spine.

The *irritable* form of dyspepsia, on the other hand, is characterised by pain of a somewhat severe type. It usually appears shortly after the ingestion of food, and lasts for a period of time varying from ten minutes to two or three hours. In most instances the epigastrium or left hypochondrium is the chief seat of the pain, but occasionally it seems to start under the lower end of the sternum and radiates thence over the chest in the direction of the breasts and towards the axillæ. The skin of the affected parts is often distinctly hyperæsthetic, and the patients will place the finger on certain spots which seem to them to be bruised and sore. In character the symptom varies considerably; at times partaking of the nature of excessive fulness, at others of sickening depression, while in not a few the sensation is extremely severe,

as if the body were being sawn or cut through with a blunt instrument. On examination the whole region occupied by the stomach is usually found to be tender to the touch, but occasionally deep pressure with the hand seems to relieve rather than to aggravate the pain.

At the commencement of the complaint the attacks of pain shew a peculiar independence and capriciousness, sometimes failing to appear for several days in succession, while at others they ensue upon every attempt to swallow food. At this time, also, the quantity and quality of the meal exercises but little influence upon the disorder; for a patient may at one time be severely punished after a meal of the plainest and scantiest description, while at another some flagrant indiscretion in diet may remain unvisited by unpleasant symptoms. These special characters serve to distinguish the case from one of ulceration or cancerous disease of the stomach, since in the latter complaints the gastric pain usually exhibits a more constant and definite relation to the ingestion of food. As a rule, the pain tends to increase in severity and to become more constant as the disease progresses; but it must always be borne in mind that when vomiting occurs immediately after the meal, the period of digestion is often too short to allow the development of the pain.

Vomiting.—This occurs in both forms of the complaint, but is infinitely more common in the *irritable* variety, especially in its later stages. In the latter it is always preceded and accompanied by nausea, and never ensues as the result of a fit of coughing, like the true vomiting of phthisis.* When it first

* See Chap. VI., Section, "Vomiting."

makes its appearance it usually takes place several hours after the meal, and serves to relieve the acidity and pain which had hitherto proved a source of considerable annoyance. But as the case progresses the vomiting gradually increases both in frequency and severity, and instead of occurring only after dinner or supper, it now ensues upon every attempt to partake of food. The result of this frequent emesis is to produce a constant feeling of sinking or faintness at the epigastrium, and to remedy this, the patient is often tempted to have recourse once more to food, when the whole series of events are again repeated.

The ejecta possess a sour taste and smell, and consist of food which has undergone little or no digestive changes. When the vomiting occurs immediately after every meal, the general nutrition is apt to become seriously affected and emaciation may make rapid progress. Occasionally death results from exhaustion, consequent upon the severity of the gastric disease, while another member of the same family and the subject of a similar but less severe form of dyspepsia, will succumb at a later period to a tubercular affection of the lungs.

State of the Bowels.—Both varieties of the dyspepsia are usually associated with a sluggish action of the large intestine, and in the *atonic* form constipation of an obstinate type is an almost invariable feature of the complaint and requires constant treatment.

In some instances the patient has always suffered from a torpid condition of the colon, and has been obliged to resort regularly to aperient medicines.

More commonly the symptom only makes its appearance with the onset of the dyspeptic troubles, the severity of which appears to depend to a great extent upon the intestinal condition. The stools in such cases generally present a pale, unhealthy, and putty-like appearance, and may contain an excess of mucus or considerable quantities of undigested food. The odour with which they are accompanied is of a particularly fœtid description. In other cases the evacuations are hard and knotty, and sometimes assume the form of little dry balls, closely resembling rabbit's dung in appearance. Piles are a frequent result of the chronic constipation, and the pain and loss of blood which they entail add considerably to the mental and physical depression which accompanies the gastric disorder.

In the more *irritable* form of the complaint the constipation is apt to be interrupted by occasional attacks of diarrhœa, which either occur spontaneously or as the result of some indiscretion in diet or from an overdose of aperient medicine. The stools are then copious and of semifluid consistency. They are dark in colour, very acid in reaction, and the evacuation is not infrequently preceded by griping pains in the abdomen, and accompanied by a scalding sensation at the anus. Some patients are apt to suffer from a sudden and loose action of the bowels during the course of each meal, and they complain bitterly that as soon as they have taken a few mouthfuls of food an attack of colic comes on, which makes a hasty visit to the closet an imperative necessity.* Occasionally the griping pain is not followed by an

* Compare with p. 52.

evacuation, while at other times the colic may be replaced by a sense of fulness and irritation in the rectum. At a later stage of the disease when vomiting has become a pronounced symptom, the bowels usually remain obstinately confined.

Acidity and Flatulence.—Fermentation within the stomach occurs to a greater or less extent in almost every case, and its various products give rise to a series of symptoms of some importance. The burning pain so frequently complained of in the epigastric or cardiac regions probably owes its origin to an excessive production of various secondary acids, although in some instances the hydrochloric acid of the gastric juice appears to be secreted to an abnormal extent. When the contents of the organ have attained a definite degree of acidity, irregular contractions of the walls of the stomach and lower end of the œsophagus are induced, with the result that a certain amount of regurgitation may occur, and the patient experiences a burning or choking sensation at the throat accompanied by the partial rejection of a mouthful of extremely sour fluid. These acid eructations are encountered in both species of the complaint, and occur in about 46 per cent. of all cases.

The gaseous products of fermentation tend to inflate the stomach and to push up the diaphragm, thereby giving rise to sensations of abdominal tension or suffocation. In more extreme cases the left side of the diaphragm may be displaced upwards by the distended viscus, and by pressure upon the heart produce feelings of faintness and an irregular cardiac rhythm. In debilitated subjects fatal syncope may

even occur from this cause. The symptoms either subide gradually, or they disappear suddenly as the pent up gases make their escape through the mouth in a series of noisy belchings. Flatulence is more commonly encountered than acidity, and occurs in about 78 per cent. of all cases.

The Tongue.—The appearance of the tongue varies considerably. When *weak* digestion constitutes the prominent feature of the complaint, the organ is generally large, pale and flabby, with numerous indentations along its edges indicative of pressure by the teeth. In other cases, again, the condition of the tongue presents no deviation from the normal, or it may be more or less uniformly covered with fur. Many of these patients suffer somewhat severely from an excessive secretion of saliva, which necessitates constant efforts of deglutition in order to keep the mouth free from fluid. Small ulcers of an aphthous type are apt to form on the sides of the tongue or upon the gums and lining menbrane of the buccal cavity, and cause considerable discomfort during meal-times. When the dyspepsia assumes the *irritable* form, the condition of the tongue is liable to even greater variation. As a rule it is large and clean, and in many instances the colour is of a darker red than normal, or the dorsum is spotted over with areas of a lighter tint. The surface is moist, and often exhibits a peculiar velvety appearance from the elongated condition of the papillæ. Sometimes the edges and tip are of a brighter hue than the rest of the organ, and the papillæ in these regions stand out prominently as vivid red dots. Not infrequently the whole tongue seems to be shrouded with a thin

white veil, through which the mucous membrane can be only dimly discerned. If gastric catarrh complicates the original disorder, the tongue assumes the shape and general appearance characteristic of that condition.

Other Symptoms.—In the *atonic form* the appetite is capricious and apt to vary from day to day. At one time there may exist an inordinate desire for food, when even a hearty meal will exercise but little influence upon the feeling of hunger; at another time a few mouthfuls appear sufficient to allay every craving in this direction. As the case progresses the appetite generally undergoes a steady diminution, until at last the patient can hardly be persuaded to take any form of nourishment.

The hands and feet are habitually cold and give rise to a sensation of heaviness, and even moderate exertion is followed by extreme fatigue and prostration. Occasionally, complaint is made of headache or neuralgia, or a peculiar sensation is felt, as though an heavy weight or a large lump of ice were pressing upon the vertex. As night approaches, extreme weariness will often induce an early retirement to bed; but after a few hours heavy sleep the patient awakes with a violent start or scream, and will toss about for the rest of the night.

The mental condition shows a tendency to depression, and in severe cases, especially those in which there exists a family tendency to tuberculosis, the case may lapse into actual melancholia. The pulse is usually small and feeble, but violent palpitation is apt to supervene upon any sudden exertion or mental shock. The heart sounds are weak, and in some

cases a slight bruit is audible over the pulmonary or mitral area.

The temperature of the body never shows any tendency to exceed the normal, and in most instances it remains constantly at a somewhat reduced point. The urine is pale in colour, often neutral or slightly alkaline in reaction, and deposits phosphates on standing.

Cases of *irritable dyspepsia* seldom show a diminished desire for food until the disorder has existed for a considerable period of time.

In the earlier stages the appetite varies from day to day, but never approaches the ravenous type occasionally observed in the other form of the complaint. In rare cases the peculiar symptom of "false hunger," so common in the later stage of phthisis, makes its appearance. In this condition the patient experiences an intense craving for food, but as soon as he has tasted a single mouthful, his appetite suddenly vanishes, and he refuses to touch another morsel. The mental state is one of extreme irritability and often closely simulates hypochondriasis. The extremities present a livid appearance, and the hands and feet are frequently attacked by chilblains. Micturition is sometimes painful, and the urine may contain an excess of oxalates or urates.

Duration and Progress.—The course of the disease is always extremely irregular, and may be interrupted by many intermissions, during which the patient appears to be regaining his former health, and the most hopeful anticipations of a speedy recovery are consequently entertained. In some cases these hopes are ultimately realised, even in cases where the dis-

order has been severe, or where the existence of a bad family history has appeared to indicate a fatal termination of the complaint.

More commonly, however, the gastric disease halts and again progresses for a considerable period of time, until at length the development of a cough with rapid emaciation reveals the true nature of the case.

ILLUSTRATIVE CASES.

CASE III.—E. C., a girl aged 25, with no family history of importance, was admitted into the Brompton Hospital in 1890, under the care of Dr. Thompson, suffering from severe dyspepsia. It appeared from her history that until the age of 22 she had always enjoyed excellent health. About that time, however, she began to experience a sensation of oppression at the chest after meals, accompanied by flatulence, and occasionally by acidity. Nausea occurred at times, but actual vomiting was rare. These symptoms were always most severe in the evening, and latterly she had frequently been sick soon after retiring to rest. She stated that she had never cared for fat, but that since the indigestion had set in she had acquired an absolute loathing for meat fat, and was unable to take the smallest quantity without nausea and retching. Bacon fat, on the contrary, was never unpleasant. The appetite was variable, but never hearty. The bowels were habitually confined, and constant recourse had to be made to aperient medicines. The limbs felt cold and heavy, and great weakness was experienced upon exertion. For the last 12 months the catamenia had been irregular, and latterly had failed to make their appearance at all. There was no cough nor sweating at nights, and the loss of flesh had only been trifling. These symptoms had improved but little under medical treatment, but the patient was sure that if only she could digest her food she would soon regain her former state of health.

On examination the girl was found to be somewhat anæmic though apparently well nourished. The tongue was large and pale and showed lateral indentations by the teeth. The pulse

was quiet and regular, and the temperature subnormal. No abnormal signs were to be detected in the chest. The abdomen was slightly distended and the epigastric region somewhat tender to the touch. The stomach itself extended to a spot $1\frac{1}{2}$ inches above the umbilicus, and presented a splash on manipulation. The urine was normal.

Five weeks later it was noted that the patient still experienced some degree of pain after food, and that occasionally she vomited in the evening when she retired to bed. She exhibited the utmost repugnance to fat meat, though bacon, butter, and cod-liver oil were not distasteful. The weight had been maintained, but the general condition was unsatisfactory from the fact that the slightest departure from the strict dietary which had been laid down was followed immediately by severe dyspepsia. The lungs presented no signs of disease and the physical condition of the stomach remained unaltered. She was sent to a convalescent home on the east coast.

After an interval of six weeks the patient returned and complained of a short cough which occasionally troubled her in the early morning and caused her to retch. The symptoms of dyspepsia had also become more severe during the few weeks which had elapsed since her departure from the hospital, and she was now unable to take any kind of solid food without experiencing pain and flatulence. The appetite was very poor, and the tendency to constipation was as strong as ever.

Three weeks afterwards the general condition was, if anything, somewhat worse. The cough was rather more troublesome, and the patient appeared to be losing ground. Nausea frequently followed the ingestion of food, and vomiting occurred every evening. The sleep was disturbed by cold sweats. Upon examination of the chest, slight comparative dulness was detected above the left clavicle, and the respiratory sounds were jerky in this position. No dilatation of the stomach could be detected.

After the lapse of another month, during which the patient removed to the country, she was found to have lost in weight and to be more anæmic than formerly. The temperature of the body was elevated a degree above the normal in the morning, and more than twice that amount at night. The dyspeptic

symptoms still remained paramount and those arising from the pulmonary disease could only be elicited by careful questioning. Vomiting now occurred after each of the principal meals, and the food which was rejected appeared to have undergone but little alteration. The lower border of the stomach extended almost to the navel. Comparative dulness existed at the left apex as far downwards as the second rib, and numerous crepitations were audible over the affected area on auscultation.

From this time onward the phthisis pursued a chronic course, and the patient suffered on several occasions from hæmoptysis. But though four years have now elapsed since its onset, the pulmonary disease has made but slow advance, and the other lung has not become implicated. It is also curious that after the tubercular disease had become established, the symptoms of dyspepsia gradually lessened in severity and are now almost superseded by those arising from the lung complaint.

CASE IV.—A gentleman, aged 32, sought medical advice in February, 1889, on account of severe indigestion. He complained that after meals he always experienced considerable pain in the pit of the stomach, and that latterly this symptom had been accompanied by vomiting. He had also been losing flesh and strength for the same period of time. Heartburn and acid eructations were a constant source of annoyance, and the spirits were depressed owing to the severity of the gastric troubles.

There was a strong history of neurosis in the family, and one of the patient's maternal aunts had died of pulmonary tuberculosis. Several sisters and one brother had suffered from severe dyspepsia, and one had also spat blood some years previously. Until the commencement of his illness the patient had considered himself a particularly healthy man, but had always possessed an intense antipathy to meat fat. The bowels were usually confined, but occasionally attacks of diarrhœa would set in, and last for several days.

On examination he was found to be a flat-chested and sparely built man, but there were no obvious signs of rapid wasting. The conjunctivæ were anæmic, and the skin supple and freely perspiring. The pulse was small and rather weak ;

the tongue clean and dark red in colour, with the papillæ at the tip somewhat injected.

The chest expanded equally well on either side, and the percussion note presented no abnormality.

The abdomen was somewhat flat, and the whole epigastric region tender to the touch. On careful examination the lower border of the stomach was found to extend to within two fingers' breadth of the umbilicus, and contained a considerable amount of gas, but little fluid. The urine was high coloured and contained neither sugar nor albumin.

Seven weeks later the patient expressed himself as feeling much better for the careful dieting and medicine which he had received. He still experienced a burning sensation at the pit of the stomach after meals accompanied occasionally by acid eructations, but the vomiting was much less frequent than formerly. He suffered much from sleeplessness, and the appetite was very irregular. There was no cough nor expectoration, and no abnormal physical signs could be detected in the chest. The condition of the stomach remained unchanged.

During the course of the next six months the patient frequently made his appearance and on each occasion had some fresh complaint. At one time the epigastric pain or the vomiting was more troublesome, at another he felt himself growing increasingly weaker; while not infrequently he was tormented by the idea that the family predisposition to mental or pulmonary disease would claim him as a victim. He gradually lost weight, but no symptoms nor physical signs could be found to denote the existence of any disease of the lung. Nevertheless the patient grew more and more concerned about himself, and as the dyspepsia appeared to be aggravated by continual worry, he was advised to take a sea voyage to New Zealand.

Upon his return about eight months later he appeared to be somewhat better, although the body weight had only increased by a few pounds. The dyspepsia had been much less troublesome during the voyage and residence at the antipodes, but since his return to England the pain and vomiting had again undergone an increase in severity. The chest was healthy, and although the epigastric tenderness was still present, the stomach showed but little signs of dilatation,

After the lapse of some two months, during which he frequently wrote long letters detailing the varying progress of his symptoms, he came up to town with the complaint that he had developed a cough, sweated profusely at night, and was therefore anxious to have his chest examined once more. When this was done it was found that the right apex was consolidated as far downwards as the second rib, with a few crepitations above the left clavicle. The temperature (morning) was 101° F., the pulse quick, and the skin perspiring. There was marked epigastric tenderness, and the lower border of the stomach reached slightly below the level of the umbilicus. The patient had experienced a great aggravation of the old symptoms of dyspepsia, and vomiting occurred after every meal. The bowels were rather loose, and the tongue dry and furred. The patient went to Bournemouth, but derived but little benefit from the change. The pulmonary disease made rapid progress, and both lungs became infiltrated. Hæmoptysis occurred several times, and the patient finally died of exhaustion, less than four months after the first discovery of the pulmonary disease, and about two and a half years after the onset of the dyspeptic symptoms.

CASE V.—A female, 25 years old, was admitted into the London Hospital in 1889, under the care of Dr. Fenwick, for an obscure affection of the stomach. It appeared from her history that none of her immediate relations had suffered from any pulmonary disease, except her only brother, who had succumbed a few months before to galloping consumption, preceded, and accompanied by severe indigestion. The patient herself had always enjoyed excellent health until about fourteen months previously, when she began to be troubled with severe pain in the chest after meals, associated with flatulence and acidity. The appetite was fairly good, but she had never been able to eat meat-fat. The bowels were usually confined, but occasionally aperient medicine gave rise to a severe attack of diarrhœa. The patient stated that during the last six months the pain in the stomach had increased to such a degree that she was unable to take any solid food at all, and even toast-water was often rejected. Latterly the vomiting had occurred almost immediately after the food, and before the pain had time to develope itself.

As the result of this inability to partake of food, the patient had undergone considerable emaciation, and had lately begun to suffer from a slight dry cough. She feared that she had caught the same disease of the stomach from which her brother had suffered. The catamenia had been suppressed for several months.

On examination, the patient was found to be extremely emaciated and anæmic. The skin was dry and rather hot, the pulse feeble and quick, and the temperature raised more than a point above the normal. The tongue was flabby, and indented by the teeth, and the breath sour and offensive.

The abdomen appeared somewhat concave, and pain was complained of when pressure was made over the epigastrium. There was no tumour to be discovered, and the stomach was not dilated. On percussing the chest, comparative dulness was discovered under and above the right clavicle, and on auscultation in this position there were numerous fine crepitations to be heard. The slight amount of expectoration which could be obtained did not contain any tubercle bacilli.

During the fortnight following, the symptoms of the gastric affection were observed with some care. The appetite was extremely capricious, but a sense of sinking at the epigastrium was often experienced which caused the patient to ask for food, although she knew by experience that she could not digest it. The utmost loathing was expressed towards foods of a fatty nature, and even beef-tea or soup created disgust if it presented an oily appearance. When the patient attempted to take any solid food, its ingestion was followed within a few minutes by a burning pain under the lower end of the sternum, which radiated over epigastric and left hypochondriac regions, and upwards toward the clavicles. Within a varying period of time vomiting ensued, the symptom of nausea being often entirely absent. The vomited material was exceedingly sour in smell, acid in reaction, and contained a trace of free hydrochloric acid.

Vomiting always gave relief to the pain, but it was usually followed by a recurrence of the epigastric depression. Occasionally the food was rejected within a few minutes after being swallowed, and before the pain had time to develop itself.

The lung disease made rapid progress, and the opposite apex

became affected within a few weeks. Tubercle bacilli were discovered in the sputum, and the temperature of the body ranged continuously at a point several degrees above the normal. The gastric symptoms were kept in check to some extent by the free exhibition of opium, and rectal feeding was commenced. The patient, however, went rapidly downhill, and died of exhaustion six weeks after her admission into the hospital. At the post-mortem, both lungs were found to be infiltrated with tubercle, while in the upper lobe of the right one there was a small cavity. The stomach was slightly dilated, but presented no signs of disease. There was no ulceration of intestines, and the supra-renal bodies were unaffected.

Etiology.—Various views have been held from time to time respecting the origin of the symptoms which characterise this form of dyspepsia.

Wilson Philip,* struck by the remarkable frequency with which fatty disease of the liver was encountered in the subjects of chronic phthisis, did not hesitate to affirm that the gastric phenomena were dependent upon the disease of this important organ, and many subsequent writers, though they do not seem to have accepted Philip's views in their entirety, always referred to a functional disorder of the liver as the main feature of the complaint. Bennett,† on the other hand, attributed the disease to an abnormal acidity of the contents of the intestine, the effect of which was to neutralise the biliary and pancreatic secretions and thus to retard the necessary emulsification and absorption of the ingested fats. Others, again, have sought an explanation for the dyspepsia in a functional disorder of the vagus and sympathetic nerves in their abdominal connections.‡

* *Loc. cit.*

† *Loc. cit.*

‡ Brinton, *loc. cit.*

But a brief consideration of these several theories is sufficient to show that the evidence upon which they were originally founded is for the most part fallacious. Thus it is now known that fatty infiltration of the liver only occurs during the later stages of chronic phthisis, and consequently Philip's views concerning the causative influence of this affection are obviously incorrect. Again, it is undoubtedly true that the intestinal contents in these cases occasionally exhibit an undue degree of acidity, but this condition depends to a great extent upon excessive fermentation of the food, and must, therefore, be regarded as a consequence instead of a cause of the disorder.

One of the most noticeable features of the complaint is the difficulty which is commonly experienced in the digestion and assimilation of neutral fats, and the abnormal symptoms which follow the ingestion of these bodies, appear to indicate that they are rapidly split up into their component parts with the liberation of a considerable amount of free fatty acid. These acids either undergo some further chemical change which prevents their combination with the alkaline bases present in the biliary and pancreatic fluids, or, what is more probable, the secretions themselves being defective in quantity or quality, emulsification and absorption are reduced to a minimum.

Since the digestion of fat usually takes place in the upper part of the small intestine it might appear at first sight that the symptoms owe a duodenal rather than a gastric origin. But I venture to think that the rapidity with which rancidity makes itself felt,

indicates that the stomach itself contains some ferment possessed of fat-splitting properties, and that the primary phenomena are therefore gastric. It is generally held that the dyspepsia stands in causal relationship to the pulmonary disease, the tubercular invasion being a direct consequence of the gastric disorder. It has, however, already been shewn that this variety of dyspepsia is particularly prone to attack persons who possess a constitutional predisposition to tuberculosis, and I am, therefore, inclined to believe that any interference with the general nutrition such as that which may arise from severe dyspepsia, by diminishing the resistance of the tissues, will readily conduce to the inception of the hereditary disease.

Treatment.—The two varieties of dyspepsia which have been described are as widely separated as regards their appropriate treatment as they are in the symptoms which they present. It will accordingly be advisable to give each a separate notice.

Atonic variety.—The difficulties which beset the treatment of this troublesome complaint are often enhanced by the patient's domestic surroundings. In many cases the relatives and friends have been accustomed to regard the symptoms of the disease as an indication of permanent ill-health, and by the constant exhibition of excessive but injudicious solicitude for her welfare, the patient has become imbued with the idea that she is a chronic invalid:—thus the complaint is continually being fostered, and the efforts of the medical attendant frustrated rather than aided. In other instances, however, and especially among the class of cases from which hospital patients are

derived, it is not uncommon to find that the gradual development in a previously healthy girl, of symptoms purely subjective in their nature, excites feelings of irritation rather than sympathy, and the patient is more often regarded by her hardier relatives as indolent or fanciful, than as a martyr. To avoid error in either direction, and to steer a judicious middle course must be the primary object of every practitioner who may be called upon to treat one of these troublesome cases. The friends must be made to understand that the symptoms are real and not fanciful, and that they arise from a weak state of health, which can only be combated by the exhibition of kindness, tempered with firmness. When once the active co-operation of the patient and her friends has been gained, the chances of success are considerably increased.

General measures.—The sudden attacks of perspiration, which are apt to occur from time to time, render the careful supervision of the clothing a question of importance. The patient should habitually wear a tight fitting under-suit of natural wool or Jaeger material during the day, while at night a soft flannel night-dress or pyjamas may be substituted for the ordinary linen or cotton garment.

The skin should be maintained in a healthy condition by the employment of a tepid sponge bath each morning, to which, when it is necessary to produce a more stimulating effect, a moderate quantity of brine or sea salt may be added. Regular exercise in the open air is indispensable; but care must be taken lest in her endeavours to follow out this injunction, the patient is induced to overtax her strength.

In many instances considerable benefit may be de-

rived from a change of climate, and the choice of a suitable residence is a matter of great moment. As a general rule, it is wise to avoid long journeys or continuous travelling, owing to the deleterious effects of fatigue in these cases. During the late spring, summer and autumn months, such sea-side places as Margate, Brighton, Hastings, or Scarborough are to be preferred, or a sea voyage may be recommended; but towns which possess an enervating climate are better avoided. According to my experience, the sea air often disagrees in the earlier stages of the complaint, and such inland health resorts as Buxton, Leamington, and especially Great Malvern are then of great value. In many instances a few months sojourn in Switzerland, or in the North of Scotland assert a most favourable effect. As winter advances, it is usually advantageous for the patient to take up her residence in the South of France or Madeira; but if this is impossible, Ventnor, Torquay, or Bournemouth may be selected.

Dietetic.—So much of the success of the treatment depends upon the digestion and absorption of the food, that the greatest care should be taken in every case to provide a suitable dietary. In this connection there are several points which are worthy of attention. The nutrition of the body depends at all times not so much upon the amount of food which is eaten, as on the quantity which is able to be digested and absorbed; and the constant appearance of undigested material in the evacuations of these cases is a certain sign that a good deal of the food introduced into the stomach is merely wasted. Again, in addition to being digestible, the food must always be pre-

pared in a manner sufficiently inviting to tempt a most variable and capricious form of appetite, for it is no means infrequent to find that a patient suffering from this form of dyspepsia will refuse to touch a dish, not from dislike to the materials of which it is composed, but because it exhibits an unpleasant or greasy appearance. Finally, a constant variation of the dietary is usually imperative, and the same dish, however agreeable it may seem to be, should never be exhibited so frequently as to excite feelings of disgust.

Alimentary substances vary greatly as regards the facility with which they are dissolved by the gastric juice, and when this latter is only imperfectly secreted, the relative digestibility of various forms of food becomes a question of primary importance. As regards animal food, the more tender the fibre, the more easily will it usually dissolve; hence mutton is more digestible than beef, and the latter than veal or pork. Chicken, turkey, and the smaller birds offer less trouble to a weak stomach than the flesh of the goose, duck, or the varieties of game. The oily fish are particularly inappropriate in this form of dyspepsia, and consequently the sole, haddock, whiting or plaice must be substituted for the salmon, mackerel and herring. The larger and coarser fish, such as the cod, are less digestible than those whose tissues are softer. It is worthy of notice that although meat-fat is usually regarded with absolute loathing, bacon will often be eaten with considerable enjoyment. As a rule, vegetables should figure but slightly in the dietary of these cases, owing to the large amount of indigestible material they con-

tain. Only those are employed which present the least quantity of cellulose ; hence good potatoes may occasionally be given where carrots or turnips are prohibited. The green vegetables are also contra-indicated in most cases from the flatulence and pain which their use is apt to engender. Fruit digests more readily after being cooked, and stewed apples, pears or prunes often form an agreeable addition to the meals. The fresh and harder varieties of fruit, on the other hand, can seldom be taken with advantage, while those which have been dried by exposure to the sun are extremely indigestible and must, therefore, be carefully avoided.

Stale bread is more readily dissolved in the stomach than that recently cooked, and the aerated variety is more easily digested than the coarser and heavier forms. In all cases the process of mastication must be performed in an efficient manner, and when this is impossible on account of the decayed condition of the teeth, the food should be finely cut up or minced before it is introduced into the mouth.

Excess of fluid with the meals must be avoided, since it dilutes the already imperfectly secreted gastric juice, and thus tends to weaken and prolong the process of digestion. In this connection it may be noted that both tea and coffee are apt to disagree, and even in those cases where it is deemed advisable to allow them, they should always be well diluted with milk. The sweeter kinds of cocoa are also apt to produce unpleasant symptoms owing to their tendency to undergo fermentative changes in the stomach ; but the decoction of the cocoa-nibs is free from this objection and may be substituted for the

more usual varieties. Alcoholic liquors are seldom necessary in the earlier stages of the complaint, but if they appear to be indicated a small quantity may be allowed with the principal meals. Bitter ale is occasionally useful as a stomachic, especially when anæmia is present, and the draught variety is better fitted for this purpose than the bottled forms. Porter and stout almost always disagree and had better be avoided. When exhaustion is a pronounced feature in the case it is well to administer some light wine such as claret or hock, but the sweeter and richer kinds like port are unsuitable from the frequency with which they give rise to acidity.

When the symptoms of dyspepsia are very severe or obstinate, it is often necessary to restrict the patient entirely to liquid food for a week or two. Soups made without vegetables, carefully skimmed beef-tea, bovril, or the essence of beef, along with milk, or milk and seltzer water, are the most suitable means of administering the necessary nourishment. In some instances it is useful to peptonise the food previous to its administration, and to render it palatable by the addition of some flavouring material such as vanilla. As soon as improvement sets in, the diet may be gradually strengthened by the addition of meat jellies, light puddings, sago, tapioca, fish, &c.

Medicinal.—There are three main indications for the use of drugs in the treatment of this complaint, which should always be kept prominently in mind. In the first place, the tendency to constipation must be overcome, and a regular action of the bowels encouraged; for unless the muscular action of the lower part of the digestive tract is maintained, that

of the upper portion is sure to be sluggish. Secondly, measures must be taken to check the excessive fermentation which occurs during the period of digestion, and which is directly responsible for the symptoms of flatulence, distension, and acidity. Thirdly, the secretory and motor powers of the stomach may require to be stimulated.

1. *The Treatment of the Constipation.*—The usual plan of securing an action of the bowels by means of saline purgatives must be avoided in these cases, since the patient is often weak and anæmic, and the use of these drugs tends to increase the symptoms of exhaustion. In most cases the state of the evacuations constitutes the best guide to the selection of an appropriate aperient. If the stools are hard and knotty, and passed with difficulty or pain, it is wise to commence the treatment with a good dose of castor oil, or by the administration of a large enema of soap and water, either of which may be repeated after a short interval. When most of the accumulated material has been successfully removed by these means, measures may be taken to maintain a regular action of the bowels. If the tongue presents a yellow fur, the breath smells foul, and the stools appear pale and fetid, an attempt should be made to stimulate the hepatic secretion and to increase the elimination of the bile. With this object small doses of calomel, mercury and chalk, or mercurial pill, may be employed on alternate nights for a week or ten days, followed by a mild course of podophyllin, leptandrin, euonymin or taraxacum. In many instances a mixture containing rhubarb, taraxacum, and nitrate of potassium, proves an excellent remedy at this stage

of the complaint. As soon as the tongue presents a cleaner appearance, recourse should be had to some mild aperient combined with a tonic. In moderate cases the patient may be directed to take either a tablespoonful of olive oil at night time or a dessert spoonful of glycerine in the morning; or an occasional dose of the compound liquorice powder, the confection of senna and sulphur, or a few grains of the extract of cascara may be prescribed. When these measures prove insufficient, small doses of the extract of aloes or aloin, combined with belladonna and nuxvomica or reduced iron, may be tried. Occasionally an electuary composed of the confection of senna, compound powder of jalap, with ginger and taraxacum, is of considerable service, and may be continued for a length of time.

One of the most valuable aperients is undoubtedly a combination of the liquid extract of cascara (ten to fifteen minims) with the extract of malt (two drachms), dissolved in a small quantity of water, and taken once or twice a day after the meals. As soon as the signs of general improvement have become apparent, the natural purgative waters of Pullna, Carlsbad, or Friedrichshall, may be cautiously tried. It should always be remembered that the sedentary inclinations of the patient tend greatly to increase the atony of the colon, and that consequently regular exercise in the open air, or moderate gymnastic practice will do much to aid the medicinal treatment.

2. *The Treatment of the Gastric Fermentation*—The careful regulation of the dietary to the exclusion of those substances which readily undergo fermentative changes, constitutes the most important indication

for the relief of symptoms which depend upon decomposition of the contents of the stomach. In the majority of the cases, however, it is also necessary to take special measures in order to check the development of various gases and organic acids during the process of digestion.

The tendency to flatulence is best combated by the administration of such antiseptic substances as carbolic acid, creasote, sulphite of sodium, salicylic acid, or naphthol. Of these the first two are by far the most reliable. Carbolic acid is best given in the form of the glycerine preparation, B. P. (eight to twelve minims), combined with carbonate of sodium, carbonate of bismuth, and peppermint or chloroform water as the vehicle. The mixture should be taken two or three times a day about an hour after the meals. Creasote is usually prescribed in the form of a pill, and may be advantageously combined with podophyllin and a small dose of the compound rhubarb pill, the whole being silvered in order to prevent an unpleasant taste. One pill may be taken after the meals once or twice a day. When the eructated gas consists principally of sulphuretted hydrogen, the mineral acids given before meals, with charcoal, either alone or combined with carbonate of sodium or magnesium, an hour or two afterwards, is usually efficacious. In some instances a tumblerful of warm water an hour after food seems to afford relief.

If acidity is the predominant feature, frequent and small doses of the liquor potassii or of the alkaline carbonates, either alone or in combination with some antiseptic, will be found of use. In other cases,

however, the administration of a mineral acid shortly before the meals appears to control this symptom more readily than any other measure.

As soon as the action of the intestines has been regulated in a satisfactory manner, and the tendency to fermentation relieved, an effort should be made to stimulate the secretion of the gastric juice and to increase the tone of the muscular tissue of the stomach. Both these indications may usually be fulfilled by prescribing a mild course of tonic remedies. When there is much anæmia, the blander preparations of iron may be employed, the saccharo-carbonate, phosphate, tartrate or ammonio-citrate being the most useful. After a time the exhibition of some bitter, such as quinine, strychnine, or calumba will be found to increase the good effects of the drug, but it must never be forgotten that iron is inadmissible as long as the tongue remains foul or nausea occurs after food. In other cases the various nervine tonics are more efficacious, and the valerianate of zinc, arsenic, or the compound syrup of the hypophosphites may be employed with considerable advantage. Cod-liver oil should be given in every instance as soon as the initial symptoms have subsided, one or two teaspoonfuls being administered twice a day after the meal. When the crude oil produces nausea or vomiting, ten minims of sulphuric ether may be added to each teaspoonful, and the mixture repeatedly shaken until it assumes a clear appearance. Some patients prefer the various emulsions, while others will offer no objection to the Kepler extract of malt with cod-liver oil. The extract of malt alone is occasionally of use, but is greatly inferior to the oil. It is most advan-

tageous when dissolved in a tumblerful of warm milk, or milk and seltzer water. If it is considered advisable to augment the digestive functions of the stomach in a more direct manner, pepsine prepared from the pig, or the lactopeptine may be prescribed after the meals, along with dilute hydrochloric acid. Occasionally a pill containing a small quantity of ipecacuanha, capsicum and ginger, administered shortly after food, is found to act more efficiently than anything else.

The irritable variety.—The general treatment of this disorder must be carried out on the same lines as those laid down for the management of the atonic form. The patient must dress warmly, take sufficient but not an excessive amount of out-door exercise, and, if possible, indulge in a tepid brine bath every morning.

Change of air is an important adjunct to the general treatment, and a sea voyage will often allay the symptoms more quickly and efficiently than many months' residence in country air. A warm and balmy climate is usually of greater value in these cases than a bracing atmosphere, and hence such localities as Bournemouth, Ventnor, or Torquay in this country, or Cannes and Madeira abroad, are suitable for winter residences; Malvern, Crieff, and Leamington, being preferred during the spring and autumn months. When mental irritability or depression constitutes a strong feature of the complaint, a constant change of scene and amusement will often be of greater benefit than a prolonged stay in one place. It is needless to add that any symptoms suggestive

of a pulmonary or laryngeal affection should be regarded with extreme suspicion and treated without delay; while in every case the chest should be examined regularly from time to time, in order to detect as early as possible the signs of tuberculous disease.

Diet.—The diet of the patient must always be subjected to the most careful scrutiny. In mild cases it is generally sufficient to limit the consumption of food to such articles as prove suitable for persons of a weak digestive habit, and to prohibit any excess of starchy or saccharine materials which are prone to undergo fermentation. It is often advantageous to allow a moderate quantity of stimulant, but the nature and dose of this must be regulated entirely by the needs of the case, and in no instance should the patient have authority to resort to spirits as the means of relieving the feelings of discomfort which occur after meals. The most useful form of alcohol is good brandy or whisky, diluted either with lithia or Vichy water.

When the symptoms are severe, and pain and vomiting ensue after every attempt to partake of food, the patient must be confined to his bed or sofa, and all alcoholic drinks prohibited. The food should consist of beef essence, bovril, peptonised soup, or bouillon, with occasional milk or custard puddings, the materials being given in small quantities, and at frequent intervals. Pure milk is very apt to disagree in this condition, and its ingestion is usually followed by pain and vomiting. Skimmed milk, koumiss, or milk well diluted with seltzer water, is more readily digested, and in some instances peptonised milk, to which some extract of malt or flavouring material

has been added, is found to answer. Beef tea should be carefully skimmed and peptonised before being given, as it is apt to excite an attack of diarrhœa. When the patient dislikes fluid nourishment, the various kinds of meat jelly may be tried, but it is usually wise to peptonise and to add some flavouring matter to these articles of food. In rare instances recourse has to be made to rectal feeding.

Medicinal.—The most prominent indication for the use of drugs is to allay the irritation of the stomach and intestines. With this object small doses of calomel or mercury and chalk may be given, or a Plummer's pill may be administered on alternate nights for a week, with an occasional dose of citrate or sulphate of magnesia. Under this treatment, with careful dieting, the symptoms usually subside to a great extent, and allow more active treatment to be undertaken. As a general rule it is best to begin with the exhibition of the various alkaline remedies, and of this class the liquor potassii will be found to be more convenient than the alkaline carbonate, as it is not so apt to be followed by flatulence. The drug may be advantageously combined with the carbonate of bismuth and a few minims of dilute hydrocyanic acid or a solution of morphine. If heart-burn and acidity are prominent symptoms the alkaline mixture may be made to contain some antiseptic, such as the glycerine of carbolic acid or the salicylate or sulphite of sodium. As soon as the symptoms have abated, it is useful to have recourse to a combination of rhubarb with compound infusion of gentian. When the appetite has returned the value of the mineral acids becomes more apparent. These

may be given before the meal, once or twice a day, and in some cases it is found that the acidity which had been but little relieved by the alkaline medicines, will now rapidly disappear. It must be remembered, however, that the mineral acids are very apt in this condition to give rise to gastric catarrh, and consequently they must be discontinued occasionally and be replaced by an alkaline medicine.

In the majority of the cases the symptoms recur from time to time, and under these circumstances the diet must be again restricted, and the treatment recommenced. This tendency to relapse is often hastened by some indiscretion on the part of the patient, who, feeling his symptoms abating and the appetite returning, will indulge in forbidden fruit, with the usual consequences. Occasionally, however, the fault lies at the door of the medical man, who is so elated by the apparent success of his treatment that he is tempted to adopt a more stimulating line of action, when he finds to his chagrin that his prescription causes a sudden return of the pain and nausea, and the patient's progress toward recovery is once more retarded.

When the signs of weak digestion supervene during convalescence, the treatment appropriate to that affection must be adopted.

In the most severe instances, where vomiting occurs after every meal, chief reliance must be placed in the administration of such sedatives as morphine or nepenthe, which may be given in a mixture with the carbonates of bismuth and sodium; or the compound powder of ipecacuanha may be prescribed in the form of a pill. When these measures are insufficient

to control the disorder, opium must be given in the solid form, one or two grains being prescribed at a time. All irritating and exhausting purgatives should be avoided, and the action of the bowels maintained by the employment of enemata or glycerine injections. Occasionally the gastric douche is successful in relieving obstinate symptoms, but I should not advise the employment of this measure until all others have failed.

CHAPTER VI.

THE VARIETY OF DYSPEPSIA WHICH USUALLY USHERS IN
AND ACCOMPANIES THE FIRST STAGE OF PULMONARY
TUBERCULOSIS.

IN a large proportion of the cases of phthisis the first symptoms of the disease are accompanied by some indication of disordered digestion, and it is, therefore, not surprising that this variety of dyspepsia has almost succeeded in monopolising the attention of clinicians, and in securing for itself the title of "The Dyspepsia of Phthisis."

The earlier writers were wont to lay considerable stress upon the occurrence of severe indigestion as an early symptom of the pulmonary complaint, and have left behind them an evidence of their appreciative recognition of the importance of the disorder in the terms "dyspeptic" and "gastric" phthisis. At the present day, however, both these designations are open to considerable objection, and one can only endorse the opinion of Sir James Clark,* who, writing on this subject as far back as 1835, said, "I do not know such a disease as 'dyspeptic phthisis,' but I am acquainted with a chronic form of pulmonary

* *Loc. cit.*

tuberculosis which is long preceded and accompanied by dyspeptic symptoms." For this reason I shall discard both the terms in question, and shall merely treat the subject as a group of symptoms of varying severity, which frequently arise during the period of tubercularisation.

General sketch.—A young adult seeks medical advice for the following reasons:—For several weeks or even months he has been feeling extremely weak, and has suffered continually from what he terms "indigestion." The appetite is deficient, and the ingestion of any kind of solid food is followed after a short interval by pain and oppression at the epigastrium or the chest. Occasionally the whole abdomen seems to be blown out, and gives rise to a feeling of suffocation. At other times the pain is of a burning character, and frequent eructations of an acrid fluid occur. These symptoms are usually associated with nausea, but actual vomiting is of rare occurrence. The bowels are very costive, and in the female the catamenia are often irregular and scanty. The patient has been losing flesh and colour, and is liable to attacks of breathlessness on exertion. In addition to these general statements a careful enquiry will usually elicit one or more of the following facts. The family to which the patient belong possesses an hereditary tendency to tubercular disease, or perhaps one of his brothers or sisters succumbed to phthisis during early adult life. From time to time a short dry cough has been noticed, especially in the early morning, and occasionally retching has ensued during an attempt to expectorate a small quantity of sticky mucus; or perhaps a little blackish material is

hawked up at intervals during the day. The appetite is exceedingly variable, and not infrequently, especially at the evening meal, a fit of coughing comes on as soon as a few mouthfuls of food have been swallowed, and terminates in retching or vomiting. All day long the patient suffers from a sense of languor and weariness, and at night the sleep is disturbed by dreams and cold sweats.

Seizing on the most prominent symptoms as indicative of the organ which is at fault, both the patient and his friends express their belief that if only the digestion could be properly performed everything would be well. But woe to the practitioner who accepts this explanation, and contents himself with prescribing for the dyspepsia without making a careful examination of the chest; for the day will soon arrive when he will awake to the unpleasant discovery that his case of "ordinary indigestion" was in reality one of incurable phthisis.

The relative frequency of Dyspepsia as a Symptom of early Phthisis.—Hutchinson* was the first to publish an accurate statement concerning the frequency with which the symptoms of indigestion are apt to accompany the development of pulmonary tuberculosis; earlier writers having been content to express themselves in more general terms. That observer found that dyspepsia was present in 92 per cent. of the cases he investigated, and that in no fewer than 55 per cent. of these the complaint had proved severe. These results were subsequently confirmed by Dobell;† while Samuel Fenwick‡ estimated that 83 per cent. of his patients at the Victoria Park Hospital suffered

* *Loc. cit.*† *Loc. cit.*‡ *Loc. cit.*

from digestive disorders during the early stages of their pulmonary disease. Pollock§ noted a similar condition in 97 out of 113 cases of rapid phthisis, and more recently Marfan|| has recorded the fact that 61 per cent. of his cases of pulmonary tuberculosis suffered from symptoms indicative of indigestion.

My own observations have been chiefly conducted at the Brompton Hospital, and are based upon a personal examination of 500 cases of phthisis, half of which were males, and half females. In each instance the facts were elicited as far as possible without the employment of leading questions, and the results were recorded along with a diagram representing the physical condition of the lungs and the stomach at the time of the examination.

The various facts obtained in this manner are exhibited in the following table, and will be more especially noticed when the symptoms of the complaint

MALES.

CONDITION OF LUNG DISEASE.	NO. OF CASES.	PREVIOUS DYSPEPSIA.	DYSPEPSIA PRESENT.	PAIN.	VOMITING.	ACIDITY.	FLATULENCE.	DISLIKES.	
								FAT.	SUGAR.
Miliary Tuberculosis .	4	—	2	2	1	—	2	2	—
Consolidation . . .	78	7	41	38	18	39	26	32	4
Excavation	168	32	42	20	12	17	21	87	11

FEMALES.

Miliary Tuberculosis .	5	—	2	2	1	—	2	3	—
Consolidation . . .	95	65	81	74	49	51	63	58	9
Excavation	149	121	93	36	32	28	32	94	12

§ "Prognosis in Consumption," p. 312, 1865.

|| *Loc. cit.*

are dealt with in detail. In the meantime it is only necessary to state that as a general result of my investigations, I am led to believe that dyspeptic phenomena of sufficient severity to attract the attention of the patient are encountered in about 70 per cent. of all cases of early phthisis, but that the development of the disorder in any individual case depends to a great extent upon the sex of the patient, the type of the tubercular disease, and the previous condition of digestive organs.

Influence of Sex.—Dyspepsia appears to be much more frequent in the female than in the male. Thus, I find that among the 96 cases of women who were admitted with signs of recent consolidation, no fewer than 81 (84 per cent.) complained of dyspepsia; while among the 78 men who presented similar signs of disease, only 41 (52 per cent.) were affected with a disturbance of digestion. The symptoms of the complaint are also apt to differ in the two sexes, women being more frequently affected with flatulence and vomiting, and men with pain and acidity.

Influence of the Type of the Lung Disease.—The most typical instances of dyspepsia are encountered in that variety of pulmonary tuberculosis which commences insidiously and progresses slowly.

In cases of miliary disease, gastric symptoms are usually present at the outset, and according to the statements of Pollock,* which I can confirm, almost every case of acute phthisis is accompanied by troublesome indigestion. But in both these varieties of the lung disease, the rapid progress of the primary mischief soon produces a train of symptoms so severe

* *Loc. cit.*

as to completely eclipse those arising from a functional disturbance of the stomach; and it is not surprising that a patient, whose main desire is to gain relief for his laboured respiration, or respite from his cough, should neglect such trifling symptoms as flatulence and acidity. On the other hand, in the more chronic forms of the complaint, and when the cough and dyspnœa are as yet undeveloped, the patient is apt to concentrate his attention upon his increasing failure of strength; and will consequently blame the deficient powers of digestion as the principal cause of his weakness and loss of flesh, and feel most acutely any symptoms which may arise during the process of food-assimilation.

The existence of previous Dyspepsia.—Among the cases I have observed, 72 per cent. of the females and 17 per cent. of the males had suffered at one time or another from moderate or severe indigestion; and since it has already been shown that females are more prone to exhibit the symptoms of dyspepsia in early phthisis than members of the opposite sex, it might seem that a previous attack of the gastric disorder predisposed to the complaint in question. But I venture to think that the enquiry is rendered of little value from the fact that women are at all times much more liable to indigestion than men, and that they invariably have a better memory for past complaints and are prone to lay greater stress upon trivial symptoms. There is, however, one fact which is worthy of notice in this connection. In every instance where dyspepsia had been present *before* the onset of the lung complaint, its symptoms became greatly aggravated when tubercularisation occurred;

and this was observed not only in cases of functional disorders of the stomach, but also in those where ulceration or chronic catarrh of the mucous membrane had existed prior to the pulmonary disease.*

ANALYSIS OF THE SYMPTOMS.

Pain.—This forms one of the most constant features of the disease, and is present to a noticeable degree in about 92 per cent. of all cases.

It is usually described as a sensation of weight or uneasiness rather than of actual pain, but in some cases a considerable amount of suffering is experienced. The symptom usually makes its appearance almost immediately after the meal, but it may be delayed for half an hour to two hours. At the commencement of the disease pain may only follow the evening meal and then only occasionally; but as the disorder progresses it gradually becomes more constant. In the majority of the cases the sensation is referred to the chest rather than to the abdomen, and often appears to be situated under the lower end of the sternum slightly to its left side. In other instances, it is the cardiac region which is more immediately affected, and when pain in this locality is combined with attacks of palpitation, the patient will often seek advice on account of a suppositious affection of the heart. Sometimes a feeling of oppression is experienced under the left clavicle, or a severe aching sensation is located in the neighbourhood of the third or fourth dorsal vertebra. In

* See Cases I. and II., p. 37.

rarer instances, where the abdomen is more immediately affected, the patient will indicate the left hypochondriac and umbilical regions as the chief seat of the suffering.

The exact character of the pain varies in different cases, and also in the same case from time to time. Some patients describe it as a feeling of a heavy weight upon the chest, or as a tightness which gives rise to difficulty of breathing. Sometimes the sensation resembles the application of a lump of ice to the cardiac region, or the skin over the left side of the thorax appears to be sore as though bruised. More commonly, however, excessive distension constitutes the chief source of complaint, and the clothes seem to grow too tight and require to be loosened in order to give relief to the respiration.

When the pain proves more severe, it assumes a burning or scalding character, and is diffused over the epigastric and cardiac regions and may radiate thence over the chest in all directions. This variety is usually accompanied by frequent eructations of an acid fluid. In some cases the patient is much distressed by an exaggerated movement of the intestines, and loud borborygmi may be heard as the gas becomes dispersed along the course of the gut. Palpitation is present in almost every case of this description, and attacks of faintness or of actual syncope are not uncommon. As a rule the pain subsides gradually; but if a copious eructation of gas occurs the relief may be more immediate.

Vomiting.—The tendency to vomit which accompanies the early stages of pulmonary tuberculosis is a symptom of considerable importance, and has from

the earliest times received a comparatively overwhelming amount of attention. It usually shows itself in the first instance when the patient arises from bed in the morning, and is preceded by a tickling sensation in the throat and severe cough. Retching follows directly upon a violent expiratory effort which is necessary to dislodge and expel a small quantity of sticky secretion from the pharynx or bronchial tubes, and if the stomach happens to contain any food or an excess of mucus, this is rejected at the same time. Occasionally, when the retching has been severe, I have known a small quantity of bilious or even blood-stained fluid to be vomited, but this is rarely encountered. It is to be noticed that the attack is neither preceded nor accompanied by nausea, giddiness, or faintness, and possesses no tendency to spontaneous recurrence; while the patient is often able to partake of breakfast without further discomfort.

In other instances, or at a later period in the same case, another variety of vomiting may occur. At first sight this appears to be directly excited by the ingestion of food, and takes place most frequently after the evening meal. Careful observation, however, usually shows that in this case, also, the vomiting is preceded and caused by a cough. Soon after the commencement of the meal the patient is suddenly seized with a violent attack of coughing, which necessitates his withdrawal from the table. On his return he will state that a tickling sensation occurred in the throat, as if something had found its way into the windpipe, and that this had brought on a choking cough, which had finally culminated in the rejec-

tion of the few mouthfuls of food which had been swallowed. These attacks are apt to be accompanied by pallor of the face and palpitation, and the sufferer will usually decline to eat any more, or restrict himself to liquid or semisolid food. Occasionally nausea and headache follow a seizure of this kind. At the outset these phenomena ensue at irregular intervals, and many days or weeks may elapse between the attacks. But sooner or later they become more frequent and more severe, and attend various meals, especially those of the mid-day and evening. In the most severe cases of this kind, every attempt to partake of food is followed by an attack of coughing which terminates in vomiting, and the patient, though he feels himself growing steadily weaker, fears to indulge his appetite on account of the discomfort which invariably follows.

There is yet another condition in which vomiting is frequently observed in the early stages of phthisis. In this the patient complains of persistent nausea, accompanied by flatulence, acidity, and sometimes by epigastric pain. Vomiting occurs during the process of digestion, and usually serves to relieve the other phenomena; but sometimes it exhibits itself independently of the ingestion of food. In these cases the tongue is usually furred, and presents a bright red tip and edge; the breath is foul, and the bowels confined, or perhaps slight attacks of diarrhœa alternate with periods of constipation. The epigastric region may be tender on pressure, and headache, or chilly sensations in the extremities, are a frequent source of complaint. These symptoms are extremely apt to recur from time to time, and when they sub-

side under appropriate treatment, the original symptoms of the gastric disorder are found to have undergone exacerbation.

Such are the three chief varieties of vomiting which occur in the early dyspepsia of phthisis; but it must be recollected that in addition to these, the same symptom is apt to be associated with such accidents as a tubercular infection of the meninges or peritoneum; while on more than one occasion I have seen severe vomiting occur in a chronic case from co-existing disease of the kidney.

Disorders of the Appetite.—In the early stages of the complaint the appetite may present little or no deviation from the normal, but as the disease progresses it tends to diminish and may even disappear.

As a rule the breakfast and dinner are eaten with a greater degree of relish than the afternoon or evening meals, for with the approach of night the appetite invariably wanes. Sometimes the patient appears to be ravenously hungry for several days in succession, and after eating a hearty meal will still declare himself to be unsatisfied. More commonly the desire for food varies from day to day and from meal to meal, or a good appetite will vanish after but slight indulgence.

Not only, however, is the appetite capricious with regard to food generally, but the patient often becomes extremely fastidious in his tastes, and will refuse to touch certain articles of diet which previously he had enjoyed; or, on the other hand, he may exhibit a morbid craving for substances which are generally regarded as the reverse of digestible or nourishing.

In this variety of dyspepsia, as in that which precedes pulmonary tuberculosis, there is usually a marked repugnance to all kinds of *fat*, that belonging to mutton, beef, veal or pork, being especially distasteful. Thus Hutchinson* found that 71 per cent. of his cases of phthisis disliked all kinds of fats; 33 per cent. could take it in small quantities, while only 5 per cent. liked it. Among my own cases, marked aversion to fat was noticed in 64 per cent.; of this number the dislike had been acquired at the commencement of the dyspepsia in 39 per cent., but had existed throughout life in 61 per cent. It is noteworthy that in the latter class the repugnance to fatty substances had increased with the development of the dyspepsia, and that in the majority of the cases one or more members of the patient's family had succumbed to phthisis.

These results are in close accord with the statements of Edward Smith,† who found that 44 per cent. of his cases of phthisis disliked all kinds of fat; while in only 37·7 per cent. was it palatable. This writer also states that 28·8 per cent. specially disliked bacon fat, 6·6 per cent. butter, and only 0·23 per cent. milk. Many of my patients, on the contrary, were able to eat bacon when they possessed the greatest abhorrence of other kinds of fat meat.

In some cases, during the early stages of the gastric disorder, *saccharine* substances are apt to disagree and therefore become distasteful. Among the cases investigated by Hutchinson‡, 29 per cent. disliked sugar of all kinds, and about 8 per cent. of

* *Loc. cit.*

† "Consumption," p. 58, 1862.

‡ *Loc. cit.*

these had acquired the aversion after the onset of the pulmonary disease. Dobell* found that sugar disagreed in 37 per cent. of the cases he examined. According to my experience, about 20 per cent. of the female sufferers from this complaint, and 7 per cent. of the male have an objection to sweet articles of food; but in the majority, a want of relish was more apparent than actual aversion, while in many the symptom had existed since birth. On the whole, I am inclined to believe that in about 7 per cent. of all cases, the patient loses his relish for saccharine substances when the first symptoms of the gastric derangement manifest themselves. In rare instances *alcohol* appears to disagree; and a man who had previously indulged freely in wine or spirits, will lose all desire for these beverages, or even actively dislike them. This symptom, however, is by no means common, and is more frequently encountered in private than in hospital practice.

The exact reason for the dislike of the various substances just enumerated, appears to arise from the fact that their ingestion is apt to be followed by symptoms of an unpleasant nature. At first acidity or nausea are complained of after a meal containing an excess of fat, and the patient states that the food "repeats" in the mouth for several hours. In more advanced cases, heartburn and acidity are followed by retching or vomiting, or a loose action of the bowels may occur. In other instances the patient suffers for several days from what he terms "biliousness," among the symptoms of which persistent nausea, headache, and a foul taste in the mouth usually predominate.

* "Lancet," ii., p. 288, 1864.

In the most severe cases of this description, the mere sight of warm or liquid fat is as objectionable to the patient as if he were suffering from sea-sickness, and the introduction of a small quantity of fat into the mouth is followed by a rancid taste or retching. When sugar disagrees the most prominent phenomena are flatulence and acidity.

When the dyspepsia has become well established, many patients develop a craving for certain substances toward which they had previously been either indifferent or ill disposed. It is usually the acid or bitter materials which enjoy the greatest popularity, and raw fruit, lemons, or sour oranges are devoured with avidity. Occasionally these tastes become decidedly morbid, and the patient will often consume the contents of a vinegar cruet during a single meal, or may even drink the acetous fluid out of a spoon. In more than one case I have known fruit jam devoured in large quantities, and with extreme relish, when nothing else could be found to tempt the capricious appetite.

Reflex Cough.—This is an exceedingly common symptom of the dyspepsia of early phthisis, and has long attracted attention under the name of “stomach cough,” or “toux gastrique.”

Soon after a meal, especially if the food taken has been somewhat excessive in amount or difficult of digestion, the patient is seized with a severe attack of coughing which usually terminates in the expulsion of the contents of the stomach. Sometimes the cough comes on without warning, but usually it is preceded by a sense of irritation at the back of the throat or base of the tongue.

Its apparent dependence upon the ingestion of food, and the fact that it generally subsides when vomiting has taken place, seem to warrant the inclusion of this symptom under the head of reflex phenomena. It is well known that, in children, gastro-intestinal irritation is often accompanied by a spasmodic form of cough, which disappears when the original disorder receives its appropriate treatment. It has, therefore, been surmised that in the present case an excessive sensibility of the lining membrane of the stomach is associated with a condition of abnormal excitability of the respiratory centre, and hence the slightest irritation of the gastric mucous membrane by the particles of food, is sufficient to produce a violent attack of reflex cough, which can bring about vomiting in a mechanical manner.

That this explanation is correct in the majority of cases there can be no question, but whether gastric irritation is an indispensable factor in every instance appears to me to be more doubtful. It is occasionally observed that the cough sets in as soon as a mouthful or two have been swallowed, especially if the food be particularly dry in character, such as stale bread or oatmeal, and in such cases the paroxysm may even occur before the material has had time to reach the stomach. It is obvious, therefore, that in many instances, at any rate, the pharynx or œsophagus must be regarded as the site of the peripheral irritation rather than the stomach. In some of these cases, also, there exists a catarrhal condition of the mucous membrane of the pharynx, and if the throat be painted with a solution of cocaine or morphine shortly before the food is taken, neither the

cough nor the subsequent emesis make their appearance. In several cases which I have observed, these local measures proved completely successful, after general sedatives had been exhibited without effect.

I would therefore suggest that in many instances the cough which follows a meal is brought about in a reflex manner by irritation of an inflamed pharynx or epiglottis, and that the term "stomach cough" should consequently be confined to that variety which exhibits a more direct relation to digestion.

Flatulence.—The distension of the stomach which commonly occurs after a meal, is accompanied in about 72 per cent. of the cases by an eructation of gas, the symptoms being rather more frequent in women (80 per cent.) than in men (64 per cent.). The gas itself is generated to a great extent by a process of fermentation, and consists of a mixture, in varying proportions, of atmospheric air, carbon dioxide, nitrogen, and hydrogen. In some cases the eructations are extremely fœtid from the presence of sulphuretted hydrogen, but I have never observed marsh gas in sufficient quantity to render the whole inflammable.*

Acidity.—This symptom is present to an appreciable extent in about 45 per cent. of the cases. In many instances the patient merely complains of a bitter or sour taste in the mouth after a fit of coughing, or an attack of flatulence; but in more severe instances, repeated regurgitations of an acid fluid occur, attended by epigastric or cardiac pain and palpitation.

* Ewald and others have recorded cases of this kind.

Constipation is an almost invariable symptom of the complaint, and generally proves rebellious to treatment. The evacuations are pale and fœtid, and contain an excess of undigested food. Occasionally the fæces are coated with a thick layer of mucus, which induces patient to believe that he is the subject of worms. Attacks of diarrhœa are apt to occur from time to time, and become frequent as the disease in the lung shews a tendency to the formation of cavities.

The *tongue* is large, flabby, and often indented along its margins by the teeth. The salivary secretion is acid, and the incisor and canine teeth often undergo a rapid form of decay. Some patients complain of extreme thirst at night time, but this is seldom a noticeable feature of the complaint.

Anæmia is always present to a marked degree, especially in women, and the *catamenia* are scanty and irregular, while not infrequently they are entirely suppressed.

Occasionally the skin of the neck, breast, axillæ, or that in the region of the cervical spine, presents an excess of pigment, and this, if it be combined with gastric phenomena of a severe character and extreme weakness, may lead to a mistaken diagnosis of Addison's disease.

The degree of fever which accompanies the pulmonary disease does not appear to exercise any decided influence upon the severity of the gastric complaint. Special observations were made on 27 cases with reference to this point, 17 of which exhibited little or no pyrexia during the day, while the remaining 10 suffered from continued fever. Con-

trary to my expectation I found that the apyretic cases complained more frequently of pain and flatulence after meals than those affected with a high temperature; indeed, many of the latter appeared to be quite free from these symptoms as long as the pyrexia continued.

Physical Examination.—There are several methods by which the size of the stomach may be determined. In order to obtain the best results from percussion, it is advisable to perform the examination at a time when the organ contains an excess of gas. This condition obtains during the course of digestion, one or two hours after a meal. The examination is commenced by percussing the left side of the chest from the second or third rib downwards, in the mammary and midaxillary lines, and marking the skin with a coloured pencil at the spot where the blow of the finger first elicits the amphoric note characteristic of the stomach. Having obtained the upper limit of the organ in this manner, the manœuvre may be recommenced at a spot just above the pubes, and repeated from below upwards until the stomach note once more becomes audible. If the viscus contains much fluid, the elevation of the buttocks by means of a pillow will facilitate the percussion of the inferior border of the organ. This method requires considerable practice and the results obtained are always somewhat uncertain. A better plan is to administer about a pint of soda water to the patient a short time before a meal, when the stomach contains but little food. By this means the organ becomes distended with a mixture of gas and fluid, and its outline can

usually be determined with great certainty by the combined use of percussion and auscultation.

In order to determine the exact value of these various methods, I undertook a series of observations on the dead subject in the post-mortem room at the Brompton Hospital. The outlines of the stomach were marked out in the manner indicated, and long pins were then inserted perpendicularly through the abdominal wall at short distances from one another. When the chest and peritoneal cavity were opened, the relation of the various pins to the margins of the viscus were noted and carefully recorded on appropriate diagrams. The results of these investigations went to prove that when auscultatory-percussion is performed in a careful manner, after some degree of experience has been gained, the outlines of the stomach may be mapped out with the utmost precision.

Some physicians prefer to distend the organ with gas, either by the administration of substances which generate carbonic acid, such as bicarbonate of sodium, followed by tartaric acid; or by the passage of a soft tube through which air can be pumped by means of a hand bellows. Both these procedures, however, are apt to prove unpleasant to the patient, and are therefore unsuitable in most cases.

When the stomach is dilated and contains a mixture of gas and fluid, a splash can often be obtained by suitable manipulation. In order to demonstrate this phenomenon the patient should be made to lie upon his back with the knees drawn up, and be told to breathe quietly with the mouth wide open. The hands of the operator are then placed over the left

hypochondriac and epigastric regions of the abdomen, with the fingers spread out to their full extent, and a series of pressure-movements rapidly executed as in the endeavour to determine the presence of deep-seated fluctuation. By these means loud splashing sounds can be elicited, which are often audible at some distance from the patient. By repeating this manœuvre at successive levels some idea can be obtained as to the area occupied by the stomach. It should be remembered, however, that the mere presence of a splash above the level of the umbilicus is by no means indicative of gastric dilatation, for it can be obtained in nearly every person who has lately imbibed a large quantity of fluid. On the other hand, the persistence of this sign for several hours after a meal is usually suggestive of an atonic condition of the viscus; while in those cases where it can be obtained by gentle manipulation below the level of the umbilicus, some degree of dilatation of the stomach can be confidently assumed.

It is extremely difficult to say with any degree of certainty how often this variety of dyspepsia is associated with an appreciable increase in the size of the stomach. In some instances the organ presents no signs of enlargement until a late stage of the disease, while in others, and especially in cases which have previously suffered from digestive troubles, the condition is encountered soon after the onset of the first symptoms. Among my 122 cases of dyspepsia associated with the physical signs of recent consolidation of the lung, twenty-eight or about twenty-three per cent. presented some evidence of enlargement of the stomach, the lower border of the organ extending as

far as the navel or below it, while in four instances the degree of dilatation was very considerable. I should imagine, therefore, that about twenty per cent. of moderately severe cases are apt to exhibit some degree of dilatation of the stomach. This estimate falls far short of that of Marfan, who was able to discover either atony or dilatation of the organ in every case which he examined.*

Physical Signs of the Pulmonary Disease.—In the majority of the cases where the initial dyspepsia is present, some indication of the lung affection can be detected on physical examination; and occasionally one is surprised to find evidence of considerable disease at one or both apices in a case which presents neither cough, expectoration, nor other symptoms suggestive of a pulmonary affection. But there is another and more important variety of the complaint in which the physical indications of the lung disease are either extremely slight or even absent altogether; and it is in these cases that the dyspepsia is usually regarded as the sole disorder, with the result that the true nature of the case escapes detection for a long time.

In other instances an attack of hæmoptysis is the first symptom to attract attention to the chest, and in such the stethoscopic indications are usually exceedingly slight, and more often to be detected about the level of the third rib, or in the axilla, than at the upper portion of the thorax.

Physiology.—The earlier investigations into the quality of the gastric juice in cases of phthisis

* *Op. cit.*

established the fact that, although in many instances it was considerably deficient in digestive powers, its activity could be increased by the addition of a small quantity of hydrochloric acid.

A few years ago I was enabled, through the kindness of Professor Hoppe-Seyler, of Strassburg, to investigate the question of the secretion of the peptic ferment in cases of phthisis, and to compare its activity in that disease with that which obtained in organic diseases of other viscera and under normal conditions. In each case the organ was removed from the body as soon after death as possible, and the mucous membrane carefully dissected off. This tissue was then finely minced and intimately intermixed, and a definite weight of the whole set aside with 100 c.c. of a 0·2 per cent. solution of hydrochloric acid for twenty-four hours, at the temperature of the body. This artificial juice was then tested upon a given weight of fresh fibrine, and each of the principal products of digestion was subsequently separated, purified, and weighed in vacuo. Nine observations of this nature were made upon cases of pulmonary tuberculosis, and the results obtained were compared with those derived from healthy cases. On examination it was discovered that the artificial juice prepared from seven out of the nine cases was in no way inferior to that obtained from apparently healthy stomachs, while in the remaining two, where the microscope demonstrated very considerable morbid changes in the mucous membrane, the artificial juice was decidedly deficient in digestive properties. These results are closely in accordance with the conclusions previously arrived at by Hoppe-Seyler.

There are now a considerable number of observations on record concerning the secretion of the *hydrochloric acid* in cases of pulmonary tuberculosis, but much difference of opinion appears to exist among the various writers with regard to its activity in the early stages of the complaint. Thus Klemperer* found that in the majority of his cases of commencing phthisis, the acid was seldom diminished in quantity, and frequently appeared in excess; and these conclusions have received the support of Immermann† and Schetty.‡ On the other hand, Brieger§ states, that among 64 cases of this disease which he examined, about one-half exhibited the normal degree of acidity, while in the remainder the hydrochloric acid shewed a diminished secretion. Bernstein's|| observations were conducted upon 17 cases of early phthisis associated with dyspepsia, and he found that, as a general rule, there was a diminution in the amount of free acid secreted, while hyperacidity was never encountered. The secretion was also less active during pyrexial periods than at others. In all cases where free acid was present the rennet ferment was also active.

Hildebrand¶ considers that the formation of the free acid is dependent upon the temperature of the body, since he found it present in the apyretic but absent in many of the pyretic cases. He also noticed the reappearance of the acid when the temperature had

* "Berlin. Klin. Woch.," 1889, 11, p. 221.

† "Wien. Med. Presse," 1888, 23, p. 24.

‡ "Deut. Arch. f. Klin. Med.," 44, p. 219.

§ "Deut. Med. Woch." 1889, 14, p. 269.

|| "Inaug. Dissert.," Dorpat, 1889.

¶ "Deut. Med. Woch.," 1888, 15, p. 292.

been reduced by antipyretic drugs. Schetty* and others, however, have arrived at the conclusion that the presence of pyrexia exerts but little effect upon the activity of the secretion.

My own experience has led me to repose no faith whatever in the clinical value of this form of enquiry. Not only does the amount of free acid vary considerably in the same case from day to day, but what is of more importance, no relation can be discovered to exist between the severity of the dyspeptic symptoms and the degree of acidity present at the same time. Thus I have repeatedly observed that in a case with continued pyrexia and a diminished amount of free hydrochloric acid, the digestive functions were apparently carried on with even less subjective distress than another which possessed a normal temperature and a normal amount of free acid. It is well known that the acid is capable of forming loose chemical combinations with certain substances which arise during the process of digestion, and I am, therefore, inclined to believe that in many of these cases where absorption from the stomach is considerably delayed, the excess of peptone or albumose present in the organ is sufficient to attach the greater part of the acid, and to render it unrecognizable by the ordinary tests. But since this loosely combined acid is still available for digestive purposes, the assimilation of the food is merely retarded and not permanently hindered.

The *absorbing capacity* of the stomach can be most easily determined by means of the iodide of potassium test proposed by Penzoldt.

* *Op. cit.*

About two grains of the salt are enclosed in a small cachet, the outside of which is carefully cleansed from all traces of the drug. The patient swallows the capsule quickly, and the saliva is tested every two or three minutes for the presence of the iodide. As a general rule, the salt appears in the saliva within twelve minutes of its ingestion, but the rapidity of its excretion depends somewhat upon the state of digestion at the time of the experiment. If the appearance of the drug is delayed longer than one hour, the absorptive power of the stomach must be regarded as distinctly deficient.

During the earlier stages of the dyspepsia there is seldom much deviation from the normal to be detected; but at a later period, when the organ becomes dilated, the rapidity of absorption is often considerably diminished. Thus, in seven instances where the physical signs of atony were present, I found that the saliva failed to exhibit the iodide reaction until after the lapse of from thirty-eight to seventy minutes, and in no instance was the salt excreted within the normal period of time.

Various plans have been proposed to test the *muscular power* of the stomach. Ewald's method is based upon the fact that salol remains unchanged during its residence in the stomach, but that as soon as it reaches the intestine it is rapidly converted into salicyluric acid, and as such may be recognised in the urine within seventy-five minutes of its ingestion.

Klemperer prefers to introduce 100 c.c. of olive oil into the empty stomach, and at the end of two hours to aspirate the residue, the difference between the amount put in and that withdrawn being the measure of the motor activity of the organ.

The latter plan I have never tried, but by the use of salol it is possible to demonstrate some degree of atony of the stomach in about forty-two per cent. of the cases of this complaint.

The chief substances which arise during the process of fermentation are lactic, acetic and butyric acids, and occasionally small quantities of alcohol. Of these the first named is the one most frequently encountered, and may be recognised in the contents of the stomach to an excessive degree in about ninety-two per cent. of all cases of early phthisis which present the symptoms of dyspepsia.

Progress and Termination.—The progress of the complaint is so extremely variable that it is almost impossible to foretell in any case the course which the dyspepsia will pursue. Occasionally the pain and vomiting grow progressively worse as the tubercular process becomes diffused through the lung, and in these the fatal termination is often directly accelerated by the imperfect assimilation of the food.

More usually, however, the gastric symptoms prove most severe at the commencement of the pulmonary complaint, and either vanish altogether when it becomes firmly established, or glide imperceptibly into those which characterise the last stages of the lung disease. For these reasons I shall not attempt to give any detailed description of the progress of the complaint, but will merely point out a few of its more prominent peculiarities.

The dyspepsia may constitute the sole symptom of the pulmonary disease.

It is this variety of the disease which attracted so

much attention at the early part of the century, and constituted the "dyspeptic" or "gastric phthisis" of the earlier writers. The subjects of this class usually possess a family tendency to tubercular disease, and exhibit an irregular appetite, with much pain, acidity, and vomiting after meals. They rapidly lose flesh and strength, and present evidences of anæmia, but they invariably ignore any slight cough they may have, and generally declare in the most emphatic matter that the stomach is the only organ at fault. In many instances some pulmonary symptoms are in reality present, but in others they are undoubtedly absent altogether; and I have carefully observed several cases of well marked phthisis associated with unusually severe dyspepsia, where neither cough, expectoration, nor night sweats, could be detected. In view of these facts I would venture to lay it down as a golden rule that, in every case of severe dyspepsia, especially if it be associated with weakness, loss of flesh, or antipathy to fat, a thorough examination of the chest should be made, and that the state of the respiratory system should be the subject of repeated investigation during the whole course of the disorder.

If this rule were habitually remembered, there can be little doubt that fewer cases of phthisis would be diagnosed as dyspepsia, and more cases of indigestion recognised as phthisis.

The dyspepsia usually amends or alters in type as the pulmonary disease progresses.

It may frequently be observed that the gastric symptoms subside as the cough and expectoration assert themselves, and I have the notes of three

cases where the dyspeptic troubles almost completely disappeared when the first distinct signs of consolidation of one apex became apparent.

In other instances the disorder continues in a modified form during the whole period occupied by the second stage of the tubercular process, and finally disappears somewhat suddenly when the first evidences of excavation of the lung are forthcoming.

Lastly, it not infrequently occurs that the gastric disorder gradually changes in character, the symptoms of atonic dyspepsia being replaced by those indicative of subacute inflammation of the mucous membrane of the stomach. This alteration in the type of the complaint coincides in point of time with the first signs of excavation of the lung.

If the pulmonary disease becomes arrested the dyspepsia generally subsides.

Even when the gastric disorder has constituted the most prominent feature of the case, the symptoms usually subside as the general health becomes re-established, and this may even occur after a considerable amount of the lung has been implicated. At the present time I have a young lady under my care who a few years ago presented the physical signs of tubercular consolidation of the right lung, from the apex to the fourth rib, the symptoms of which were almost entirely masked by those of the gastric disorder. Change of climate, however, served to arrest the progress of the primary disease, and since that time the dyspepsia has remained completely in abeyance, although evidences of dilatation of the stomach still exist.

Etiology.—Numerous theories have been put forward to explain the occurrence of dyspepsia in cases of early phthisis, but none of them are entirely satisfactory, while many are based upon absolute fallacies.

Some writers have supposed that the gastric symptoms arise from the chronic inflammation of the coats of the stomach which is so often encountered after death from phthisis. But it has already been shown that in the early stages of the pulmonary disease no histological changes can be detected in the gastro-intestinal tract, and that the interstitial inflammation only makes its appearance after softening of the tubercular material has taken place.* In addition to this fact it must be remembered that the dyspepsia is always most severe at the commencement of the lung disease, and usually undergoes amelioration when excavation occurs. In like manner, the fatty infiltration of the liver, which was regarded by Philip as the direct cause of the indigestion, only appears at a late stage of the phthisis, and probably owns the same cause as the chronic inflammation of the stomach and intestines. It must, therefore, be allowed that the complaint in question is not a result of organic changes in the mucous membrane of the digestive tract.

The statement that the secretion of hydrochloric acid usually fails in cases associated with severe pyrexia, appears at first sight to lend support to the theory that the dyspepsia is dependent upon the increased temperature of the body which accompanies the tubercular disease. There are, however, one or two facts which seem sufficient to negative this view.

* See p. 17.

In the first place, the gastric phenomena are always more severe in the early stages of the lung disease, when there is little or no pyrexia, than at a later period when the temperature ranges high; and, indeed, some of the worst instances of the disease are encountered in cases which present no pyrexia whatever. Secondly, cases of phthisis whose temperature is habitually high, are often more free from the symptoms of indigestion than those in which apyrexia is a constant phenomenon; and patients have frequently assured me that they felt they could digest their food better during the periodic attacks of fever than at other times.

Another view which still receives a considerable degree of support, refers the gastric derangement to venous engorgement of the mucous membrane of the stomach, induced by the disease in the pulmonary tissue. Thus Ewald* states that the disorder is the outcome of "venous hyperæmia and stasis, which in their turn are the results of the disordered pulmonary circulation." But I would venture to remark that in point of time the dyspepsia occurs before the disorder of the circulation, and that it usually lessens instead of increasing in severity as the circulation through the lungs becomes more embarrassed. After death, also, in cases of early phthisis, the stomach never presents any evidence of this suppositious engorgement.

Perhaps the most popular theory is the one which refers the whole series of symptoms to the effects of nervous irritation.

The well known fact that both the lung and the

* "Diseases of Stomach," vol. ii., p. 651.

stomach receive filaments from the pneumogastric nerves, appeared to Bourdon, Budd, and other writers to afford an easy explanation for the occurrence of a gastric disorder in cases of pulmonary tuberculosis. If it be assumed that the deposit of tubercle irritates the nerve endings in the alveoli of the lungs, it is easy to comprehend how its effects may be transmitted to the centre in the medulla, and reflected thence to the peripheral distribution of the nerve in the mucous membrane of the digestive tract, giving rise to pain or vomiting according to the severity of the irritation.

To such an extent was this theory of reflex disease carried, that more than one observer stated his belief, that severe and long-continued irritation in the lung or the stomach could give rise to organic disease in the other viscus.

It is, however, worthy of remark, that there exists no other variety of lung disease which appears to be able to originate reflex phenomena of a similar kind, for neither in pleurisy, pneumonia, bronchitis, nor malignant disease of the pulmonary tissue, do the symptoms of dyspepsia habitually exhibit themselves. It is also singular that the dyspepsia should always prove most severe at a time when the pulmonary irritation is at a minimum, and tend to disappear as the tubercular mischief develops.

Gueneau de Mussy,* Peter,† and others have modified this theory of peripheral irritation, and prefer to regard the compression of the main trunk of the vagus nerve by enlarged glands in the mediastinum as the

* "*Clinique Médicale*," part iv.

† "*Clinique Médicale*, part ii.; "*Lécons sur la Phthisie*," no. 54.

immediate cause of the gastric phenomena. That the nerves in question are occasionally affected in this manner there can be no doubt, for in addition to the observations of the previously mentioned writers, Quenu* discovered evidences of vagus compression in six cases of phthisis. But even this observer admitted that the condition was one of considerable rarity; and among more than one hundred necropsies on cases of pulmonary tuberculosis which I attended, I was unable to observe a single instance in which it could be confidently asserted that enlarged glands in the thorax exerted pressure upon one or other pneumogastric nerve. On the other hand, during the same period of time, I witnessed the post-mortem examinations on two cases of lymphadenoma and one of sarcoma of the mediastinum, in each of which the nerves in question were completely embedded in the growths. None of these cases, however, exhibited the symptoms of dyspepsia during life. It also appears that mere compression by enlarged glands does not tend to produce any histological change in the nerve itself.†

From these facts it would appear probable that the gastric disorder is neither a reflex nor a direct expression of irritation of the pneumogastric nerve.

Lastly, considerable stress has been laid by Trousseau,‡ Sée,§ Peter,|| and others, upon the relation of the dyspepsia to the symptomatic anæmia. These writers consider the gastric derangement to be dependent upon a deficient secretion of the pepto-

* Quoted by Marfan, *Op. cit.*, p. 68.

† Quenu could discover no histological changes in his cases.

‡ "Clin. Méd. de l'Hôtel-Dieu," "Léçons sur les Pseudo-Chloroses."

§ "Les Dyspepsies Gastro-Intestinales," 1883.

|| *Op. cit.*

hydrochloric acid with atony of the muscular walls of the organ, both of which are the outcome of the anæmia. Marfan,* also, insists upon the fact that the chlorotic condition of early phthisis often disappears as the disease progresses, and coincidently with this the gastric phenomena generally subside.

For my own part, however, I cannot accept this doctrine in its entirety. It has been pointed out that the dyspepsia of phthisis is in many of its symptoms quite a peculiar disorder, and differs considerably from that which usually accompanies simple chlorosis. There also appears to me to be a want of accord between the degree of anæmia and the intensity of the dyspepsia, for I can recall several instances where the symptoms of the latter disorder were extremely prominent, while the former condition was apparently absent.

On the whole I am inclined to believe that both the anæmia and the dyspepsia are independent symptoms, and that the chemical alterations in the blood which take place at the onset of the tubercular disease, are directly responsible both for an excessive destruction of the red corpuscles, and also for the functional disturbance of the digestive and generative systems which usually occurs about the same time.

Treatment.—However prominent may be the symptoms of the gastric derangement which accompanies the onset of pulmonary tuberculosis, it must never be forgotten that they are merely the outcome of an infinitely more serious disease, and that consequently

* *Op. cit.*, p. 73.

their treatment must ever remain subservient to that of the original complaint. Each case must be treated on its own merits, and the following remarks are only intended to apply to those in which the disorder of digestion calls for immediate and special attention.

In every case the clothing of the patient requires supervision. The prevalent habit of wearing silk or linen next the skin should be discountenanced, and natural wool or flannel underclothing substituted as far as possible, in order to promote the immediate absorption of the cutaneous moisture. The greatest care should also be taken to prevent unnecessary exposure to cold or damp ; and although a moderate amount of exercise in the open air is usually advisable, over-fatigue must be prevented.

The skin should be encouraged to perform its functions in a satisfactory manner, by the employment of tepid baths in the early morning ; but if these should occasion feelings of chilliness they must be omitted. Hot baths had better be avoided as far as possible, since they are apt to give rise to faintness and vomiting.

Change of air is generally of great value in the treatment of these cases, and certain points with regard to the selection of a suitable climate are worthy of attention. Whenever the pulmonary disease exhibits a tendency to rapid progression or the temperature of the body remains persistently above the normal, it is unwise to permit the patient to travel or change his abode, since the exhaustion produced by the journey and the sudden deprivation of the home comforts often counterbalance any good which might otherwise have accrued from the change. When, however, the

pulmonary disease is in abeyance, and the gastric disorder the prominent feature of the case, a sea voyage to the Cape or the Antipodes, or a change of residence, often proves of signal service.

During the winter a visit to the Riviera, Switzerland, Egypt, or Madeira, often answers well; but if the home counties are preferred, Torquay, Bournemouth, or Ventnor prove efficient substitutes. Many cases, however, derive harm rather than benefit from sea air, and lose energy and appetite, or suffer from continual nausea. For such, the inland health resorts are to be preferred, and Malvern, Leamington, Buxton, Crieff, or Harrogate, in the late spring and autumn months, answer admirably.

As in every other variety of dyspepsia, the selection of an appropriate *dietary* is a question of primary importance. In this connection, the lack of appetite and the capricious tastes which characterise this form of dyspepsia must be carefully borne in mind. The food should be prepared in the manner which is both pleasing to the eye and agreeable to the palate, and a constant variety introduced into the menu, in order to avoid producing a feeling of indifference by a too frequent repetition of the same articles of food. Greasy and fatty materials almost always excite disgust, and these should consequently be displayed with caution, or even withheld altogether. In like manner, highly spiced or very sweet substances often prove unpleasant, and many articles of diet will prove inadmissible, though otherwise attractive and nutritious, owing to their excessive sweetness. On the other hand, the peculiar disposition so often evinced towards bitter or acid substances can be

taken advantage of, and lemon or acid flavouring may be added to the food in order to make it more palatable than it would be under ordinary conditions.

The same general rules must be observed in the diet of these cases as were laid down for the treatment of the variety of dyspepsia which precedes the development of pulmonary tuberculosis.*

The food must be nutritious, and as easily digestible as possible, and the patient should be encouraged to preserve regular hours for his meals. Alcohol is seldom required in the early stages of the complaint, but at a later period a certain amount is usually necessary. If, however, extreme prostration be present a small quantity of good brandy or whisky may be allowed with each of the principal meals; but stout and the sweeter and richer wines are not to be recommended on account of their tendency to create acidity.

When severe pain accompanies the ingestion of food, and vomiting occurs after every repast, the diet should consist entirely of liquids, and the patient be kept in bed during the continuance of the urgent symptoms. Milk with barley or lime-water, beef-tea, thin soup made without vegetables, essence of beef and bovril are the most convenient forms in which to administer the necessary nutriment, and they should be given in small quantities at a time and at frequent intervals. If the general nutrition has already suffered severely, or if difficulty of assimilation is a prominent symptom, the various articles of food may be artificially peptonized and flavoured with lemon, vanilla or some other essence agreeable to the patient's taste.

* See p. 91.

If milk appears difficult of digestion or is disagreeable, it is often a good plan to add a tea-spoonful of the extract of malt to each pint, and to allow the mixture to be taken after the meals, either alone or diluted with seltzer water. In some instances equal parts of warm milk and albumin water answer admirably.

As soon as the symptoms show signs of abatement the diet may be cautiously increased by the addition of various meat jellies, milk or tapioca puddings, lightly cooked eggs, white fish or sweetbread. Dobell strongly recommended the employment of pancreatised foods in the treatment of this disorder, and found them to be uniformly successful. It is true that nearly every patient can take such materials with ease, but according to my experience their nutrient value has been over-estimated.

Occasionally the inunction of a drachm of cod-liver oil once or twice a day is followed by good results.

There is one variety of the complaint which is occasionally encountered where a different line of treatment has to be adopted. The subjects of this form are almost invariably young women in whom the physical signs of phthisis are ill marked. Vomiting ensues upon every attempt to swallow food, and great emaciation and prostration accompany the persistence of this symptom. Anæmia is invariably present, and not infrequently there exists a family predisposition to neurosis. The only plan which offers any decided chance of success in these cases is to confine the patient to bed and to feed her regularly and frequently with peptonised milk and beef essence. If the vomiting continues, recourse must be had to the

stomach tube, through which half a pint of nourishment containing a little brandy may be administered at intervals of one or two hours. The daily employment of massage to the abdomen and extremities, combined with the use of a constant current of moderate strength to the spine, proves a most useful adjunct to the dietetic treatment. In other instances the repeated application of a small blister to the epigastrium is of signal service. These cases appear to be fundamentally hysterical, the symptoms of the neurosis being aggravated and in many instances developed for the first time at the onset of the tubercular disease. As soon as possible, regular exercise in the open air should be enforced, and if change of air is considered desirable, it is usually best to advise a constant change of scene and amusement rather than a permanent residence in one place.

Of all the means at our disposal to increase the general nutrition of the body the administration of cod-liver oil is undoubtedly the most useful, and in this connection there are several points which deserve special attention. There is a general belief that the oil is not admissible in cases of atonic dyspepsia on account of the imperfect manner in which digestion is carried on. But far from this being the case, the material usually proves of extreme value in the treatment of chronic atony of the stomach, and many people who have profited but little from peptonised or pancreatised foods will show signs of immediate improvement when the oil is introduced into the treatment. In addition to its nutritious properties, it is often found that the exhibition of cod-liver

oil relieves the short dry cough so characteristic of the early stage of phthisis more efficiently than anything else ; and it occasionally cures the so-called bilious headaches which constitute a frequent symptom of the complaint, possibly, as Hutchinson suggested, by increasing the elimination of the bile.

It is a common belief that the nutritive effects of the oil vary directly with the amount consumed, and patients are often instructed to take several ounces a day with the hope of producing rapid effects. But as a rule, more harm than good accrues from this wholesale administration of the remedy, and not only are nausea and other unpleasant symptoms extremely apt to ensue, but in many instances diarrhœa is set up and the oil has to be discontinued altogether. Clinical experience appears to indicate that the quantity which is capable of being conveniently assimilated is somewhat limited, and that half an ounce in divided doses during the course of the twenty-four hours represents the maximum.

It is wise, therefore, to commence with a teaspoonful once or twice a day, and after a time to increase the dose to twice that amount. If any unpleasant symptoms follow its ingestion the patient should be advised to take it only on retiring to rest at night, or he may lay down for ten minutes on a couch after each dose.

There are many varieties of the oil in the market, and numerous emulsions and mixtures are recommended on the score that their use is not accompanied by unpleasant sensations. But according to my experience, the less pure varieties, such as are used in hospital practice, are much more nourishing

than the specially prepared colourless or tasteless kinds.

Each patient usually possesses a favourite method of taking his oil. Many float it on lemon or orange juice; others prefer coffee, milk, or ginger or sherry wine as the vehicle; while some can only manage to swallow it when enclosed in a gelatine capsule. A piece of bread or dry biscuit eaten immediately afterwards appears to cleanse the mouth and to prevent to a great extent the unpleasant taste which is apt to linger in the buccal cavity for a long time.

It is only in cases where a patient trial has proved that the oil cannot be tolerated, that recourse should be had to emulsions or mixtures. Of the latter the most palatable is a combination of the oil with the extract of malt (Kepler), one or two teaspoonfuls of which may be taken twice a day after the principal meals. The malt extract alone is greatly inferior to cod-liver oil in the treatment of this form of dyspepsia, but it sometimes appears to promote digestion when administered after food. Pure cream is often recommended as a suitable substitute for cod-liver oil, but this seldom proves of much value from its tendency to produce nausea after a short trial. It is best given with a small quantity of malt extract and well diluted with soda or seltzer water.

Most writers agree that the *medicinal treatment* should be commenced by the administration of certain alteratives. With this object small doses of mercury and chalk may be given two or three times a week, with occasional draughts of some saline purgative. In other cases a mild mercurial pill with hyoscyamus

or colocynth may be substituted for the grey powder. Under this treatment the general condition of the patient soon shows signs of improvement, the colour and appetite return, nausea becomes a less frequent symptom, and the stools gradually assume a more healthy appearance. When these results have been achieved, it is usually wise to omit the exhibition of the mercury for a time and to have recourse to a mild course of stomachic remedies, while at the same time the large intestine is encouraged to perform its functions in a proper manner. In many instances taraxacum, combined with one of the alkaline carbonates and small doses of rhubarb, answers the purpose admirably, while in others the addition of nitrate of potassium, as recommended by Todd, appears to add to the efficacy of the medicine.

As soon as the condition of the digestive organs will permit, various tonic remedies may be prescribed, the exact selection of which must be determined by the particular circumstances of the case. If the tongue remains pale and flabby, and the alvine evacuations are dark in colour and offensive, the mineral acids will prove of service. Of these the dilute hydrochloric or nitro-hydrochloric are the most effective, but occasionally phosphoric acid appears to be of value. The mixture should be given once or twice a day, between the meals, and after a short time quinine or cinchona may be added to it with advantage.

Tonic treatment of a more energetic kind should not be commenced until the principal errors of digestion have been corrected, and in all cases it is wise to discontinue the tonic treatment at intervals,

and to substitute a short course of grey powder or taraxacum and rhubarb.

The advisability of giving iron in these cases has been the subject of much dispute. Trousseau and Germain Sée maintained that the drug was inadmissible, from the fact that its administration encouraged the spread of the tubercular disease. The experience of English physicians, however, has not tended to the support of this belief, and iron in all its forms has been recommended since the time of Philip, for the treatment of this variety of dyspepsia. More recently Marfan has traversed the dictum of Trousseau, and holds that the drug is often of great value in these cases. My own experience on this point is quite in accordance with that of other English writers, and I consider the various preparations of iron to be invaluable when administered with due precaution. As a rule, the blander preparations, like the tartrate, ammonio-citrate and saccharo-carbonate, are the most suitable, and they should be given in small doses at first. Many patients prefer the granular effervescent preparation of the carbonate, while others again find Blaud's pills the most convenient form in which to take the drug. Latterly I have been in the habit of prescribing the gelatine capsules of the carbonate of iron, each of which contains the equivalent of three of the pills. They are easily swallowed, and their effects appear to be more rapid and complete than those of any other preparation of a similar character. Steel wine is a favourite remedy with many practitioners, it is, however, more suitable for children than for adults. In some instances the syrup of the iodide or of the phos-

phate of iron proves the most suitable form in which to administer the drug. When iron disagrees recourse may be had to the various other tonics. The tincture of nux vomica and the solution of the sulphate of strychnine are both of value, and may be given in a bitter infusion between the meals. The phosphate and valerianate of zinc are chiefly indicated when neurotic symptoms constitute a prominent feature in the case. Arsenic has long enjoyed a high reputation in the treatment of the dyspepsia of phthisis; but in my experience its effects are less satisfactory than is generally supposed. Not unfrequently the drug appears to increase the tendency to nausea after meals, and the appetite often deteriorates rather than improves from its use. The liquor arsenici hydrochlorici is the most convenient preparation, and it may be combined with dilute hydrochloric acid and the compound infusion of gentian. In all cases the effects of the arsenic should be carefully watched, and the remedy omitted if the tongue becomes foul or nausea is complained of. Quinine is very apt to disagree, and is best given in the form of a pill.

TREATMENT OF SPECIAL SYMPTOMS.

1. *Vomiting*.—The vomiting of early phthisis owns so many different causes that it is hardly a matter of wonder that up to the present no single drug has been discovered which can be regarded in the light of a specific. Each variety, therefore, requires a separate notice.

The morning sickness.—It has been shown that this form of vomiting is one of the earliest symptoms of the dyspepsia, and that it usually lessens or disappears when the pulmonary disease has made considerable advance. Nausea is seldom present, and the patient attributes the symptom entirely to an attack of coughing which comes on soon after rising from bed. Gastric sedatives are generally ineffectual in the treatment of this form of the complaint, and the most reasonable chance of success lies in the adoption of measures which may prevent the onset of the cough. In many cases the trouble arises from a catarrhal condition of the pharynx, the secretion which accumulates upon its surface during the night being the cause of the peripheral irritation. In such instances the remedial efforts must be directed to the cure of the local complaint. The throat should be gargled frequently during the day with a solution containing chlorate of potassium and borate of sodium, to which some tincture of myrrh can be added if necessary; or lozenges containing these salts may be prescribed. Occasionally the simple liquorice lozenge answers better than anything else, and the patient may be directed to suck one of these before getting up, or may sip a small quantity of barley water or rice water. If more active measures are required, the topical application of the glycerine of tannic acid, perchloride of iron, or other astringent solutions may be made to the back of the pharynx. Sometimes the indulgence in strong tobacco tends to aggravate the catarrh, and in these cases smoking must be prohibited. In a few instances I have known the application of a weak solu-

tion of cocaine to the throat prevent the occurrence of the retching.

When the cough arises from the pulmonary disease the treatment is much less successful, and the principal efforts must be directed to allay the bronchial irritation. The patient should be supplied with demulcent drinks to sip during the night, and if cough comes on in the early morning, he may take a dose of linctus, or a teaspoonful of glycerine and lemon juice, or a little codeia jelly. This form of vomiting, though extremely troublesome, seldom gives rise to serious symptoms; but in rare cases a fit of coughing at any time of the day will provoke retching and emesis. In such, small doses of morphine and hydrocyanic acid may be exhibited, and the irritability of the nervous system allayed by a course of bromide of potassium along with belladonna or hyoscyamus.

Vomiting from reflex cough.—When vomiting ensues as the result of the reflex cough excited by the introduction of food into the stomach, a different line of treatment must be adopted. The indication in these cases is to diminish the irritability of the terminal branches of the vagus nerve and of the nervous centres situated in the medulla. When the emesis follows immediately upon the ingestion of the food, the condition of the pharynx and epiglottis should be investigated, and if these structures show signs of inflammation, local measures must be resorted to. It is in these cases that the application of cocaine to the throat just before the commencement of the meal is followed by such success.

When the reflex phenomenon is produced by actual

contact of the food with the gastric mucous membrane, reliance must be placed upon the use of gastric sedatives. Bromide of potassium, hyoscyamus, cannabis indica, aconite, oxalate of cerium, chloroform water, creasote, camphor julep, prussic acid, and a host of similar drugs have each been recommended in their turn, but although they often prove of service there is not one which can be regarded as certain to relieve. In mild cases it is usually sufficient to prescribe a small dose of morphine along with dilute hydrocyanic acid, carbonate of bismuth and chloroform water shortly before each meal; or to administer a few grains of Dover's powder along with the carbonates of sodium and bismuth in the form of a tabloid. Codeia is often extremely serviceable since it does not tend to spoil the appetite or produce that train of unpleasant symptoms which often follows the use of opium. Occasionally a glass of warm water at the beginning of the meal appears to prevent the development of the vomiting. According to some authorities the citrate of caffeine is of great value in these cases; while others, again, strongly advocate large doses of belladonna with quinine or valerianate of ammonium.

Continental physicians speak highly of the tincture of iodine in ten minim doses combined with a few grains of iodide of potassium.

The tendency to vomiting can sometimes be obviated by the administration of a diffusible stimulant during the early part of the meal; good brandy or whisky diluted with seltzer water being the most convenient for this purpose. In certain cases, however, the passage of a soft tube each day has

tended to prevent the attacks of vomiting ; and forcible feeding through the tube is sometimes of great value. Lavage of the stomach with warm water has been recommended, but it is not apparent that any decided good has accrued from the employment of the gastric douche.

In very severe cases, where vomiting continues persistent and the patient can retain no food whatever in the stomach, and consequently emaciates, the free administration of opium is, I believe, the only means we possess of averting a fatal issue. The extract is the best preparation, and it may be given in full doses every three or four hours, the general nutrition being maintained by the use of nutrient enemata. In most cases the vomiting soon subsides under this treatment and within a short time peptonised foods may be administered by the mouth.

When vomiting occurs after meals associated with the symptoms indicative of subacute inflammation of the stomach, the various sedative mixtures in an effervescing form may be given before food, and the general treatment regulated in accordance with the rules previously laid down.

Constipation.—In the treatment of this complaint all irritating and exhausting purgatives must be carefully avoided. In mild cases the patient should be advised to take a tumblerful of warm water first thing in the morning, or a dose of phosphate of sodium or a small quantity of Vichy water. In most instances a small dose of aloine, with iron, nuxvomica, or gentian, will be found of use ; or a confection of sulphur and senna, either alone or in com-

bination with compound powder of jalap and syrup of ginger may be prescribed. Cascara is extremely useful in most cases and may be given either in the tabloid form or along with the extract of malt. It is always wise to combine some tonic remedy with the aperient drug, since the purgative effect is usually intensified by this means.

Enemata of soap and water or glycerine suppositories are indicated when prostration is a prominent feature.

CHAPTER VII.

THE VARIETY OF DYSPEPSIA WHICH ACCOMPANIES THE TERMINAL STAGE OF PHTHISIS.

THE advent of the final stage of the tubercular disease is often heralded by a recurrence of the dyspepsia which had proved so troublesome a symptom at the onset of the lung complaint. Once more the patient begins to experience discomfort after his meals, with nausea and occasional vomiting; and attacks of diarrhœa come on at short intervals and prove extremely exhausting. As a rule, this variety of dyspepsia does not attract much attention, being completely overshadowed by the pulmonary symptoms; but occasionally the cough and expectoration remain latent, and under these conditions the gastric disorder may constitute the sole cause of complaint. In one instance of this nature which came under my notice the phthisis was never suspected until a few days before death, while in another the lungs were found to be riddled with cavities at the necropsy, to the great astonishment of the medical attendant, who, owing to the absence of the ordinary pulmonary symptoms, had regarded the case as one of simple gastritis.

Among my 316 cases of pulmonary tuberculosis which presented the signs of excavation, 135, or 42·5

per cent., suffered from dyspepsia of sufficient severity to attract notice. Women appear to be more liable to the complaint than men, for while 62 per cent. of the female subjects of chronic phthisis exhibited symptoms of a gastric derangement only 25 per cent. of the males suffered in a similar manner.

Analysis of the Symptoms.—The *appetite* invariably diminishes with the progress of the disease. At first it is capricious, and the patient may exhibit the same fanciful tastes as in the earlier stages of phthisis. Occasionally the signs of a false appetite are present in a very marked degree, and a feeling of intense hunger will be suddenly replaced by a loathing for food as soon as a few mouthfuls have been swallowed. As the complaint advances the anorexia becomes complete, but in rare instances the patient may retain his relish for food until the last, or may even suffer from extreme hunger.* As a rule the distaste for fat persists during the whole course of the pulmonary complaint, and eventually even butter and cod-liver oil are unable to be tolerated owing to the nausea and discomfort which is apt to follow their ingestion. It is a curious fact, however, that many patients appear to lose their antipathy to meat-fat as the final stage of the disease approaches, and a few even acquire a certain amount of relish for some of its varieties.

About 57 per cent. of my cases suffering from this variety of dyspepsia were unable to eat fat, and 8 per cent. disliked sugar.

Thirst is a frequent though not invariable symptom.

* Andral, "Path. Inter.," i., 513.

It may exist only at meal times, but it is more commonly complained of in the intervals of taking food. The sensation is usually relieved most readily by drinking cold water, but sometimes hot or acid liquids are preferred.

Painful sensations at the epigastrium, occurring either spontaneously or as a result of an effort of digestion, are comparatively rarely encountered in this form of dyspepsia. Among my 135 cases of the disorder, only 56 or 41 per cent. exhibited this particular symptom.

When it occurs the pain usually shows itself within five to thirty minutes after the meal, and varies from a sense of oppression and discomfort to one of intense burning over the epigastric and cardiac regions, or between the shoulders. Deep pressure with the hand generally tends to increase the suffering, but sometimes it affords distinct relief. I have never been able to detect any hyperæsthesia of the skin over the abdomen or chest.

Although epigastric pain in cases of chronic phthisis is usually suggestive of gastric catarrh, it must never be forgotten that the same symptom may arise quite independently of any inflammatory affection of the stomach. Thus, in several cases which have come under my care, a violent attack of pain occurred immediately after each meal, and usually terminated in vomiting. The whole of the epigastric region was very tender to the touch, and diarrhœa proved a constant source of complaint. The close relation which existed between the introduction of food and the onset of the pain appeared to indicate the presence of severe gastric catarrh or even ulceration,

but at the necropsy no disease of the stomach could be detected. In each instance, however, the transverse colon was the seat of numerous and deep tubercular ulcers, the peritoneal aspect of which was often covered with lymph.* It is probable, therefore, that in these cases the flatulent distension of the stomach which occurred during the process of digestion, caused displacement of the diseased colon, and in this manner was able to simulate true gastric pain.

Pleurisy attacking the diaphragmatic surface of the lung is occasionally accompanied by pain in the upper part of the abdomen of great severity, and in more than one instance I have known it give rise to an erroneous diagnosis of ulceration or perforation of the stomach or duodenum.†

In these cases, however, the pain seldom exhibits any definite relation to the ingestion of food, while it is invariably aggravated by a deep inspiratory effort or by a cough. The temperature of the body tends to rise rather than fall, and the tenderness over the abdomen is much more superficial in character than that which accompanies ulcer of the stomach or acute peritonitis.

In the following case the cause of the intense suffering remained a mystery during life, and the curious pathological condition which was found to exist at the necropsy appears to be worthy of a special notice.

CASE VI.—A labourer, 44 years of age, was admitted into the Brompton Hospital in 1891, under Dr. Thompson, suffering from chronic disease of the lungs. On examination both lungs

* This was also noticed by Louis and Fox.

† Author, *Diaphragmatic Pleurisy Simulating Acute Abdominal Disease*, "Lancet," July 8th, 1893.

were found to be extensively affected, and a large vomica existed at the right apex. The liver was enlarged and the urine contained a considerable quantity of albumin.

Two days after admission the patient suddenly sat up in bed and complained of a violent pain in the abdomen, vomited, and rapidly became collapsed. The abdomen appeared extremely tender to the touch, but no tumour or other abnormal condition could be detected. The pain was somewhat paroxysmal in character, and continued until death, which occurred quite suddenly about an hour after the onset of the attack.

At the necropsy, the liver, spleen and kidneys, presented evidences of lardaceous disease, but no signs of peritonitis or perforation of the gastro-intestinal tract could be discovered. The pancreas was greatly enlarged and of a deep purple colour, and on section its tissue was found to be infiltrated with blood, which here and there presented the appearance of large clots. No aneurismal dilatations of the arterioles could be found, but under the microscope the vessels showed signs of extensive amyloid change.

It would therefore appear that the sudden effusion of blood into the tissue of the pancreas was responsible for the violent pain and collapse which preceded death.

If a chronic ulcer of the stomach should happen to coexist with the pulmonary disease, the pain is usually localised to one spot in the epigastrium, and hæmatemesis may occur from time to time, while the previous history of the case affords some clue as to the nature of the disease.

Tubercular ulcers of the stomach seldom give rise to any special symptoms, though occasionally severe or even fatal hæmatemesis has been observed (Lorey,* Gille-Bréchemin,† Bignon‡).

* "Bul. d. l. Soc. Anat.," 1874, p. 596.

† "Bul. d. l. Soc. Anat.," 1879, p. 452.

‡ *Perforation Spontanée de l'estomac*, "Thèse d. Paris," 1854.

Contrary to the usual statement that *vomiting* is a constant feature of the gastritis of phthisis, only 32 per cent. of my cases exhibited this symptom. Occasionally an attack of coughing occurs shortly after a meal, and terminates in the rejection of the contents of the stomach, but this accident is much less frequent than in the earlier stages of the pulmonary disease.

When vomiting constitutes a well marked feature of the complaint it occurs at irregular intervals and often in the early morning before any food has been taken. *Nausea* is an almost constant symptom and may persist for many hours after the emesis. The ejecta are sour and contain an excess of mucus, and occasionally consist entirely of this material. *Hæmatemesis* is extremely rare, but I have seen small quantities of blood vomited during a severe attack of retching.

Flatulence and *acidity* were noted in about 30 per cent. of the cases, and usually co-existed with nausea and vomiting.

The *bowels* are generally irregular in their action at the commencement of the complaint, periods of constipation alternating with sharp attacks of diarrhœa. Toward the last, however, the bowels are relieved every hour or two, and the exhaustion which arises from this symptom materially hastens the fatal termination of the case.

In the early stages the *tongue* is usually redder than normal, and presents a bright red tip and a dorsum covered in a patchy manner with yellow fur. Later on the surface of the organ acquires a morbidly red and shining appearance, or it becomes dry

in the centre and presents aphthous patches along its tip and edges.

Physical Examination.—The exact determination of the outline of the stomach in these cases is often a matter of some difficulty, owing to the rigid state of the abdominal wall and the pain which accompanies palpation and percussion.

In cases of moderate severity the stomach almost always exhibits some evidence of dilatation, and the lower border may be found to reach as far as the navel or slightly below it. As the pulmonary disease advances the area occupied by the organ becomes progressively increased, and at a late stage the greater curvature may extend several inches below the level of the umbilicus or even reach as far as the pubes (see p. 2).

Out of 317 cases of chronic phthisis associated with vomica, I found that 273, or about 86 per cent., showed signs of dilatation of the stomach, and in every one of the 135 cases which suffered from dyspeptic symptoms the characteristic splash could be obtained at or below the level of the navel.

Physiology.—The *peptic ferment* continues to be secreted by the stomach until the mucous membrane has received permanent damage from the attacks of subacute inflammation which are apt to occur during the final stage of pulmonary tuberculosis, and an artificial juice prepared from these cases usually exhibits a considerable degree of activity. When, however, the secreting structures have become the seat of a diffuse fibrosis or of lardaceous disease, the

artificial juice is found to exert little or no action upon fibrin or albumen (see p. 125).

With regard to the secretion of the *hydrochloric acid* there is still a considerable divergence of opinion. Schetty* states that he could discover no marked alteration in the quantity of the free acid in the various cases which he examined; while Immermann† was able to detect its presence even in advanced cases of phthisis accompanied by severe pyrexia. Hayem‡ and Einhorn§ seem to regard the secretion as extremely irregular, while Klemperer|| found that the free acid gradually disappeared from the contents of the stomach as the pulmonary disease progressed. In 34 cases of advanced phthisis investigated by Brieger,¶ the hydrochloric acid was normal in 16 per cent., absent in 9.6 per cent., and diminished in the remainder. My own experience on this point is limited, but as a rule I found that the secretion was diminished in the later stages of the disease. I am strongly inclined, however, to believe that the exact degree of acidity in any case depends to a great extent upon the quantity and quality of the ingested food and the rapidity with which the products of digestion are removed from the stomach by absorption; and since there does not appear to be any constant relation between the amount of free acid present and the severity of the dyspepsia, I must confess my scepticism as to the practical value of the investigation.

When the mucous membrane of the stomach is

* *Op. cit.*

† *Op. cit.*

‡ "Gaz. des Hôpitaux," Sept. 3rd, 1892.

§ "New York Medical Record," 1889, i., p. 483.

|| *Op. cit.*

¶ *Op. cit.*

attacked by lardaceous disease, the secretion of hydrochloric acid rapidly fails and soon ceases altogether (Cahn and von Mering,* Edinger,† Riegel‡).

The motor power of the stomach always shows signs of weakness in these cases (Klemperer), and absorption as determined by the method of Penzoldt is invariably delayed.

In almost every case gastric fermentation is active, and its various products can easily be recognised by appropriate means.

Course and Termination.—When once the dyspeptic symptoms have shown themselves in a case they usually persist until death. The tongue becomes dry and is attacked with thrush, the discomfort after food gradually increases, the anorexia becomes complete, and the patient succumbs either to extreme exhaustion or to some accident connected with the pulmonary complaint. It is, however, important to note that if the tuberculous disease undergoes temporary arrest the gastric phenomena usually exhibit a corresponding remission, while the permanent cure of the phthisis is almost invariably followed by disappearance of the dyspepsia. This latter fact is frequently observed, and I have notes of many cases of chronic fibroid phthisis of 8 to 12 years duration, in which the main symptoms of indigestion were completely absent, though the stomach still showed signs of considerable dilatation. §

* "Deut. Archiv. f. Klin. Med.," 39, p. 232.

† "Deut. Archiv. f. Klin. Med.," 29, 1881, p. 555.

‡ "Zeit. f. Klin. Med.," 11, p. 167.

§ Twenty-three cases of this description were met with in various infirmaries and sick asylums in London. In each instance the patient has previously suffered from severe dyspepsia, which since the arrest of the tuberculous disease had either disappeared or become quite trifling in degree.

Etiology.—The earlier writers were accustomed to refer the dyspepsia to such causes as abuse of alcohol, irritant medicines, and chronic congestion of the stomach from an embarrassed circulation through the lung.

It is now, however, a well known fact that with the formation of cavities in the lung the gastro-intestinal tract is apt to become affected with a chronic form of inflammation, and the group of symptoms which characterise the dyspepsia of this period of phthisis are such as might be expected to accompany a catarrhal condition of the digestive organs.

Treatment.—As long as the appetite persists the patient should be encouraged to eat small quantities of white fish, chicken, or finely minced meat, &c. When these articles of food can no longer be tolerated, it is necessary to have recourse to liquid or semi-solid foods, such as soups, beef-tea, meat essence, eggs and milk. Artificial peptonisation renders these materials more easy of digestion and assimilation than in their crude state, but it is usually necessary to add to them some flavouring in order to cover the unpleasant taste engendered by the process. If diarrhœa is a prominent symptom beef-tea should be given with caution, and the milk should be diluted with barley or albumen water. It is generally necessary to allow some form of alcohol, brandy or whisky being the most convenient form in which to administer the stimulant.

The medicinal treatment chiefly consists in the exhibition of various gastric sedatives, with the occasional use of astringent drugs to check the diarrhœa.

Of the former, the extract of opium or morphine are by far the most reliable, but sometimes codeia or nepenthe are of material service.

Some writers have advocated the employment of the stomach douche in the treatment of these cases, but I have never seen an instance where it was considered advisable to try it.

Bismuth is generally useful in checking the diarrhœa, but it is apt to lose its effect after a short time, and should then be combined with other astringents or with opium. Occasionally the acetate of lead or sulphate of copper prove of use.

CHAPTER VIII.

PERFORATION OF THE GASTRO-INTESTINAL TRACT IN CASES OF PHTHISIS.*

PERFORATION of the stomach may occur during the course of pulmonary tuberculosis from a variety of causes. It has already been shown that simple gastric ulcer is frequently associated with chronic phthisis† and it is, therefore, not remarkable that the disease in question should occasionally give rise to a fatal issue. Thus, during the last few years I have seen three cases in which acute general peritonitis was the immediate cause of death; in two of these a simple ulcer of the stomach was found to have perforated the walls of the viscus, while in the third the disease was situated in the first part of the duodenum within half an inch of the pyloric orifice.

Tubercular ulceration of the stomach, on the other hand, seldom terminates in complete perforation, owing to the numerous adhesions which form around the base of the disease; and in the literature upon the subject I have only been able to discover one instance where this event is stated to have occurred, and even in this case the tubercular nature of the gastric lesion appears to be somewhat doubtful.‡

* See Author and Dr. Dodwell, "Lancet," July, 1892.

† See p. 33.

‡ Paulicki, "Berlin Klin. Woch.," Aug. 26th, 1867, p. 349.

Occasionally an encysted collection of pus arising from tubercular peritonitis discharges itself through the wall of the stomach,* and there are a few cases on record where a caseous lymphatic gland in the neighbourhood underwent suppuration and finally burst into the cavity of the viscus.†

In one case a tubercular ulcer of the colon was found to have eaten its way through the coats of the stomach and to have established a gastro-colic fistula.‡

Although tuberculous ulceration of the intestine is such a common complication of pulmonary phthisis its various modes of termination appear to have received comparatively little attention. The majority of the standard works on medicine and pathology are content to dismiss the question of perforation with the statement that complete rupture of the intestinal wall is a possible but unusual result of its tuberculous affection, while those that deal with the subject in greater detail differ considerably among themselves, both as to the frequency with which perforation is apt to ensue, and the clinical symptoms which are supposed to portray the accident. Wilks and Moxon§ state that complete perforation is rarely met with and they can record but three instances in point, in one of which the appendix vermiformis was the seat of the lesion. On the other hand, Lebert|| found that perforation

* Fox, *Op. cit.*; Bignon, "Thèse de Paris," 1884.

† Besnier, "Soc. Anat.," 1857; Hayem and Galliard, "France Médicale," 1880; Beneke (cited by Förster), "Path. Anat.," Leipsig, 1863; Pitt, "Path. Trans.," 1888, p. 107.

‡ Oppolzer, "Wein. Med. Presse," 50, 1857.

§ "Pathological Anatomy," p. 414.

|| "Klinik der Brustkrankheiten," 1874.

occurred in 3 per cent. and Willigk* in 5 per cent. of the cases they had observed, while Leube† only noted it twice among several hundred cases. Habershon‡ found that among 56 cases of acute peritonitis due to perforation of the gut, only 4 resulted from tuberculous ulceration. Grawitz§ in his analysis of 867 cases of peritonitis, states that 20, or 2·3 per cent., were the direct consequence of tuberculous disease of the bowel. With regard to the actual results of perforation of the intestine the various authors are at still greater variance. Spillman|| in his excellent treatise on gastro-intestinal tuberculosis records several instances where death had occurred from perforation of a tuberculous ulcer, and, while he infers that local abscess is not an uncommon result of the accident, he asserts that extravasation of the intestinal contents into the general cavity of the peritoneum is excessively rare. Theodore Williams,¶ on the other hand, remarks that acute general peritonitis is the most frequent result of perforation of the intestine occurring in the course of chronic phthisis. Rindfleisch** lays special stress upon the frequency with which various portions of the small intestine are apt to ulcerate into one another and to establish irregular channels for the circulation of their contents.

* "Prager Vierteljahrschrift," 1856.

† Quoted by Spillman: "La Tuberculisation du Tube Digestif," p. 116.

‡ "Transactions of the Medical and Chirurgical Society," vol. xliii., 1860,

p. 5.

§ "Charité Annalen," 1884. Also Louis observed one case of perforation among 150 necropsies on phthisis, Dittrich 5 in 403, Wilson Fox 3 in 77, and King Chambers in about 7 per cent. of all cases of ulceration.

|| *Op cit.*

¶ "Pulmonary Consumption," p. 196, 1887.

** "Pathological Histology," New Sydenham Society's Translations, p. 449.

According to Orth* the vermiform appendix is a favourite spot for tuberculous disease, and perforation in this position is very liable to be followed by the formation of a local abscess and subsequent fistula. In view of these conflicting statements it is possible that a further investigation into the subject may prove of interest and perhaps of some practical value, and I have therefore examined the records of 2000 necropsies on cases of phthisis performed at the Brompton Hospital for Consumption with reference to this point.

Tuberculous ulceration of the intestine is rarely met with as a primary disease in adults, although in children it is by no means uncommon. In the great majority of cases the disease is secondary to pulmonary phthisis, and the frequency with which the two conditions are associated has been the subject of some controversy. Louis† found evidences of ulceration in about four-fifths of all his cases; Bayle‡ in 67 per cent.; while Lebert§ states that the intestinal complication existed in 67 per cent. of his cases in Breslau, and in only 39 per cent. of those examined by him in Zurich. Willigk|| found the intestine affected in 49·6 per cent. of his cases, and more recently Eisenhardt¶ discovered a similar lesion in 56·6 per cent. of the cases of phthisis examined at München.

My own conclusions tally closely with those of the two latter observers, since I found that the intestine

* "Lehrbuch der Path. Anat.," i., p. 838.

† "Phthisis," Sydenham Society's Translation, p. 74.

‡ Quoted by Williams, *Op. cit.*

§ *Ibid.*

|| *Op. cit.*

¶ "Inaug. Dissert.," München, 1890.

was stated to have been the seat of ulceration 500 times in 883 cases, or in about 56 per cent.

From these facts it would appear that while the absolute frequency with which the bowel is diseased in cases of phthisis is apt to vary in different countries, as a general rule it can be detected in rather more than half the cases. All writers are agreed that the ileum, especially its lower portion, is the region of the gut most frequently attacked by tuberculous mischief, and among my 500 cases of ulceration the ileo-cæcal region was found to be affected in 85 per cent.; while in 9·6 per cent. it proved to be the only portion of the intestine which showed any trace of disease. From this spot the liability to the tuberculous affection diminishes steadily as we proceed in either direction toward the extremities of the bowel, and consequently it is found that the duodenum and rectum are never diseased unless the other portions of the tract are already in an advanced state of ulceration. Thus among the cases already alluded to, ulceration was noted to have been present in the duodenum in 3·4 per cent., in the jejunum in 28 per cent., in the ascending colon in 51·4 per cent., in the transverse colon in 30·6 per cent., in the descending colon in 21 per cent., in the sigmoid flexure in 13·5 per cent., and in the rectum in 14·1 per cent.

Attention has been drawn to the fact that the vermiform appendix is peculiarly liable to exhibit patches of superficial ulceration in cases of chronic phthisis. Unfortunately the cæcal appendage appears to have so frequently escaped examination that it is impossible to state from my notes with any degree of cer-

tainty the relative frequency with which this portion of the bowel was affected. It is, however, quite exceptional to find the appendix free from disease when the ileo-cæcal region is in a state of tuberculous ulceration. In 17 instances it was expressly stated that the appendix was the only portion of the intestinal tract which showed evidence of ulceration; and the question naturally arises whether this phenomenon was of a simple or tuberculous nature. In every case the ulceration was multiple and no concretion was noted to have been present. In two instances of a similar nature which have come under my own immediate observation, the superficial character of the disease appeared to denote a catarrhal rather than a specific origin, but on submitting the tissue to microscopic examination all doubt as to the true nature of the disease was set at rest by the discovery of numerous tubercle bacilli. Without wishing to infer that all cases of ulceration of the appendix associated with pulmonary phthisis are necessarily tuberculous in their nature, I would submit that this portion of the bowel, owing to the large amount of lymphoid tissue in its walls, its abundant blood supply, and the comparative stagnation of its contents, is particularly liable to fall a victim to tuberculous infection, and that the subsequent ulceration may closely simulate in its macroscopic features the results of simple catarrh.

Among my 2,000 necropsies I find 25 instances in which perforation of the intestine had occurred as the result of tuberculous ulceration. These figures would appear to indicate that the accident in question only takes place in about 1·2 per cent. of all cases of

phthisis, a result which, although it closely agrees with the statements of Louis and Dittrich, nevertheless falls far short of the estimates made by other observers. These discrepancies, however, are easily accounted for when enquiry is made into the exact meaning which various writers have attached to the term "perforation."

It is well known that advanced tuberculous ulceration of the intestine is invariably attended by a considerable degree of local peritonitis, and it consequently happens that, owing to the firm adhesions which form round the floor of an ulcer, actual perforation may occur without giving rise to fæcal extravasation and general peritonitis.

Thus, in a curious case reported by Lepelletier, a perforating ulcer of the ileum had contracted adhesions with an enlarged and caseous mesenteric gland which eventually came to fit like a plug into the aperture in the wall of the bowel. Perforation, therefore, may be of two kinds, partial or complete, the evidences of the former being latent and often difficult to ascertain without a careful search, while the latter attracts attention immediately the abdomen is opened, from the striking evidences of inflammation in the serous membrane. For these reasons it is obvious that those statistics which, like my own, are founded upon the complete form of the disease, do not represent by any means the absolute frequency with which tuberculous ulceration is apt to terminate in perforation of the bowel. At the lowest computation, partial or complete perforation probably occurs in 5 per cent. of all cases of chronic phthisis, or, in other words, in 10 per cent. of the cases where ulceration is present.

These facts by no means corroborate the statement made in text-books to the effect that typhoid ulceration of the intestine is far more liable to end in perforation than the tuberculous type of the disease. If we believe that every case of typhoid fever is accompanied by an intestinal lesion and that only 10 per cent. of the entire number of deaths are the result of perforation of the bowel, then even allowing the primary disease to be attended by the high mortality of 20 per cent., we find that only 2 per cent. of the cases of typhoid ulceration terminate in perforation, instead of 10 per cent. as in the case of the tuberculous lesion.

Perforation may occur in any portion of the intestinal tract, and at the outset it would seem probable that the region of the bowel which is most frequently attacked by ulceration would also be most liable to perforation. But a glance at the figures relative to this point will show that the surmise is only partially borne out by fact. It is true that the ileum is the favourite site both for ulceration and rupture; but, on the other hand, the cæcum, which is almost twice as often affected as the jejunum, is much more rarely the seat of perforation than the small intestine. Again, tuberculous ulceration is infinitely more common in the ascending colon than in the duodenum; nevertheless we find that while perforation in the former is excessively rare, ulceration in the latter is attended by more danger to life than at any other spot in the whole digestive tract.

In the following table a contrast is offered between the tendency exhibited by the various portions of the

intestinal tract to ulceration and perforation respectively. The first two columns are derived from an analysis of 500 cases of tuberculous disease of the intestine, while the remainder has been compiled from a comparison of the total number of cases of ulceration with the various instances of perforation occurring in the same anatomical region. It will, therefore, be readily understood that although the first half of the table is fairly accurate, the latter half can only convey a general idea, as it cannot lay claim to any great degree of accuracy.

Table to Illustrate the Relative Frequency with which Tuberculous Ulceration and Perforation occur in the Different Regions of the Intestine.

REGION.	PERCENTAGE OF ULCERATION.	SOLE SEAT OF DISEASE.	PERCENTAGE OF ULCERATION TERMINATING IN PERFORATION.	PERCENTAGE OF ACUTE PERITONITIS.	PERCENTAGE OF FÆCAL ABSCESS.
Duodenum	3'4	—	10'0	75'0	25'0
Jejunum	28'0	1'4	0'53	65'0	35'0
Ileum	60'2	4'4	1'1	76'0	24'0
Ileo-cæcal (last foot of ileum and contiguous portion of cæcum)	85'0	9'6	—	—	—
Cæcum	—	—	0'12	17'0	83'0
Appendix	(50'0)	(3'8)	(0'1)	—	—
Ascending colon	51'4	1'8	0'08	—	—
Transverse colon	30'6	1'0	—	—	—
Descending colon	21'0	—	—	—	—
Sigmoid	13'5	—	0'37	—	—
Rectum	14'1	—	0'34	—	—

Of the 25 instances of perforation which occur among my series of post-mortem examinations, 15 terminated in acute general peritonitis, and the re-

maintaining 10 by the formation of a local abscess. Since this number is but small I have collected an additional 28 cases from various sources, making in all a total of 53. These have been divided for the purpose of analysis into two classes, and the general features of the cases will be considered under the headings of "acute general peritonitis" and "fæcal abscess."

Acute Peritonitis.—This group includes 34 cases, in 28 of which a single ulcer had perforated the cavity of the peritoneum, while in the remaining 6 a previous lesion had occurred and given rise to a fæcal abscess. The average age at the time of death was 29, but in those in which the appendix was the seat of the lesion the average age was only 17.

Men were more frequently the subject of this affection than women, in the proportion of nearly 2 to 1.

Among the entire number no fewer than 27 originated in disease of the small intestine, the great gut being only affected in 7 cases, and in no fewer than 4 of these the vermiform appendix proved to be the seat of the fatal perforation. The great mobility of the small intestines and the relative thinness of their walls afford an ample explanation of the more frequent occurrence of perforation in this portion of the gut; while the fact that acute diffused peritonitis should prove so common a result of the accident is readily understood when it is remembered that the various coils receive an entire investment from the peritoneum, and that their contents being of a liquid nature can be readily diffused over the whole surface of the serous membrane.

Of the 27 cases situated in the small gut 3 occurred in the duodenum, 3 in the jejunum, and 21 in the ileum; while those due to disease situated in the large intestine comprised 4 perforations of the appendix, 1 of the cæcum, and 1 in each of the ascending and transverse portions of the colon.

Although the reports of many of the cases fail to state the exact position of the fatal lesion, there are still a few facts which serve to throw some light upon the various causes which predispose to perforation.

It is well known that simple ulceration of the duodenum is almost invariably situated within a few inches of the pylorus and is very prone to terminate in fatal peritonitis. Now, it has already been mentioned that tuberculous ulceration of the duodenum is very rare, and that when it does occur the disease is more often encountered in the lower portion than in the immediate neighbourhood of the pylorus. In 4 cases where perforation occurred in this portion of the intestine no fewer than 3 were situated within 2 inches of the pyloric orifice, and in each instance acute peritonitis ensued as the result of the accident. It is, therefore, probable that although tuberculous ulceration of the first part of the duodenum is of very unusual occurrence, the disease is in this position fraught with infinitely greater danger to life than when it attacks any other portion of the digestive tract; a result which is possibly due to the corrosive action of the gastric juice upon the mucous membrane when in a state of disease.

Of all the causes which predispose to perforation of the ulcer mechanical strain on the walls of the gut is probably the most important. It is a common ob-

ervation that rupture is particularly apt to occur at a spot where the bowel is habitually bent or kinked; and there can be little doubt that the hinge-like movement which obtains at such a bend in a coil must exert a very deleterious influence upon the wall of the intestine already weakened by disease. But perhaps the most interesting feature in this connection is the part played by a permanent increase of tension in the fluid contents of the bowel.

Every pathologist is aware how easy it is to blow out the base of an ulcer by passing through the gut a stream of water at a high pressure; the probability of rupture depending directly upon the thinness of the floor of the ulcer and the pressure of the aqueous stream. Now in 6 cases perforation was stated to have occurred within twelve inches of the ileo-cæcal valve, and in 5 of these the valve itself was described as much thickened and ulcerated, with the diameter of the intestine at this spot considerably narrowed. In another case where perforation took place in the ascending colon, it was noted that the bowel was considerably dilated owing to the presence of a tuberculous stricture four inches lower down. It is probable, therefore, that under certain conditions the progress of the ulceration may lead to narrowing of the diameter of the bowel, and the increase of tension thus induced may relieve itself in the direction of the peritoneal cavity.

As a general rule perforation only ensues upon extensive destruction of the intestinal tract by the tuberculous processes; but among my cases there occur one or two exceptions to this rule. Thus, in one instance a single ulcer the size of an almond had

formed in the ileum and death had resulted from rupture of its floor. In another case fatal peritonitis owed its origin to destruction of the vermiform appendix, which proved to be the only portion of the bowel affected by tuberculous ulceration.

Although perforation usually arises from a progressive destruction of the wall of the gut from within outwards, it appears that under certain conditions it may occur in a totally different manner. In two cases the disease was stated to have commenced in the peritoneal and subperitoneal tissues, extending inwards toward the lumen of the bowel in the form of hemispherical masses covered by the submucous and mucous coats of the intestine. Ulceration but rarely occurred over the summits of these tuberculous tumuli; but in both the instances under notice the caseous material had undergone softening at one spot, and eventually discharging itself in either direction, had given rise to escape of fæcal matter into the cavity of the peritoneum. In another case an abscess had arisen in connection with tuberculous disease of the right Fallopian tube, and discharged itself through the base of an intestinal ulcer, the sudden irruption of the intestinal contents into the sac causing its walls to give way and lighting up an attack of peritonitis. In one remarkable instance a round worm had burrowed its way through the floor of an ulcer, and its exit into the general cavity of the peritoneum had been followed by a fatal stream of fæcal material.

It has already been mentioned that in 6 cases a previous perforation had given rise to the formation of a local abscess; and an examination of the locality

of these abscesses revealed the fact that in 5 instances they were connected with the same portion of the bowel which subsequently became the site of the fatal lesion, while in the remaining case a chronic abscess around the cæcum had been followed by a fatal perforation of the duodenum. In all the cases at present under notice fæcal matter was discovered in the peritoneal cavity at the necropsy, the intensity of the secondary inflammation of the serous membrane varying according to the length of time which had elapsed between the onset of the perforation and the death of the patient. In three cases the peritoneum was found to be in a state of general tuberculous disease.

Clinical.—The symptoms arising from perforation of the intestine are usually so characteristic in their nature that it might easily be supposed that the rupture of a tuberculous ulcer in a case of chronic phthisis would meet with certain and instant recognition. But a comparison of the clinical and post-mortem records of these cases shows only too clearly how readily the disease may escape notice altogether, or its symptoms be confounded with those arising from less important conditions. I find from the clinical histories of the foregoing cases that in nearly three-fourths of the total number the fatal lesion was accompanied by distinct premonitory symptoms. The most characteristic of these was severe abdominal pain, usually coming on from twelve hours to three days before actual perforation took place, but in one instance lasting for nearly a fortnight. The pain was referred by the patient to the epigastrium or

right iliac region, and was increased by pressure or muscular effort ; in many cases it appeared to be rendered more severe by the ingestion of food Vomiting, often of a bilious type, was a constant accompaniment of this condition and sometimes proved so severe as to prevent administration of food by the mouth. The temperature usually showed a slight tendency to rise, the pulse was quickened, and in a few cases the diarrhœa, which had previously resisted all treatment, either diminished or ceased entirely. In a few instances the abdomen was noticed to have become distended, and hyper-resonant on percussion. Such premonitory symptoms are important, as they are obviously dependent upon the condition of local peritonitis which so invariably precedes the final catastrophe, and their early recognition may prove of value by affording an indication for preventive treatment.

Actual perforation is usually sudden in its onset and the symptoms to which it gives rise are extremely characteristic. In three instances the accident occurred while the patient was straining at stool, in two others it took place as the patient was walking about, while in another it appears to have followed directly upon a severe attack of retching. In each case a sudden and severe pain was complained of, sometimes situated in the umbilical region, but more often referred to that part of the abdomen which contained the diseased organ. In many cases this sudden onset of pain was accompanied by a sensation of an internal snap, and the patient dwelt upon the fact that something had given way in his abdomen. Vomiting and collapse quickly followed

these initial symptoms, the features rapidly becoming shrunk and blue and the surface of the body covered with a cold sweat; the pupils dilated, the pulse became quick and feeble and mental depression pronounced. In every case the temperature exhibited a sudden and characteristic fall to a point considerably below the normal. If diarrhœa had existed before the accident it now entirely disappeared. When death resulted from collapse it usually occurred within three to seven hours of the accident, but sometimes life was prolonged for about a day and a half. In those cases which survived this stage the symptoms of shock were gradually replaced by others arising from an inflammatory affection of the peritoneum: the temperature gradually recovered itself and rose somewhat above the normal; the pulse grew wiry, with an increased rapidity of beat; vomiting became urgent and the abdomen exhibited all the characters indicative of diffuse peritonitis. Death finally ensued from cardiac failure after being postponed for thirty-six or forty-eight hours. It is clear, therefore, that perforation may bring about a fatal result in two different ways—by direct shock or from acute general peritonitis; and it is worthy of notice that the immediate danger from shock bore a definite relation to the position and size of the perforation; for the higher the site of the lesion in the intestine and the more rapid the subsequent extravasation the more profound and quickly fatal proved the subsequent collapse.

The train of symptoms indicated in the foregoing sketch are common to all cases of perforation of the gastro-intestinal tract irrespective of its cause, and their supervention in a case of chronic phthisis would

admit of but little doubt being entertained as to the exact nature of the complication. But under certain conditions it is found that the rupture of a tuberculous ulcer may be accompanied by symptoms of the most equivocal nature, and it is to such abnormal varieties that I would venture to draw special attention.

In nearly one-fourth of the entire number of cases the patient appeared to succumb from gradual exhaustion, and the necropsy, which revealed that death had resulted from purulent peritonitis following intestinal perforation, afforded a complete surprise to those who had watched the progress of the case. The question, therefore, arises why the same lesion should in some instances be followed by such a characteristic and severe train of symptoms, while in others its effects are hardly to be distinguished from those of the primary disease, and although it kills, why it should do so in such an unostentatious manner. The answer appears to be that in order for fæcal extravasation to be accompanied by clinical phenomena of a pronounced type, it is requisite that both the peripheral and central portions of the nervous system should be capable of an immediate reaction to a sudden stimulus. But if either the central nervous system or the surface of the serous membrane be previously deprived of its natural irritability from exhaustion or disease, then the symptoms of shock and subsequent inflammation, which under ordinary circumstances are so characteristic of perforation of the bowel, will be either indifferently developed or even entirely absent.

In looking over the cases which presented ill-defined symptoms of peritonitis, I find they are

capable of being arranged in two divisions, according as the central nervous system or peritoneum appear to have been primarily at fault. In the first case the symptoms of the accident were unable to exhibit themselves on account of being masked by the profoundly asthenic condition of the nervous system, while in the other they remained latent during life, because the surface of the peritoneum had been deprived of its natural irritability owing to its previous invasion by miliary tuberculosis. That acute general peritonitis may supervene during the later stages of chronic phthisis without arousing any suspicion of its presence in the mind of the physician has been the subject of frequent remark, and of the difficulty which such cases of masked peritonitis present in diagnosis the following offers a fair illustration :—

A youth who was the subject of advanced phthisis complained of diarrhœa accompanied by occasional attacks of nausea and pain in the right iliac region of the abdomen. A few days after admission into hospital, and without any marked accession of pain, he commenced to vomit and was soon unable to retain any nourishment in the stomach. The temperature, which had ranged about 101° F., showed at first but little variation, but afterwards gradually fell with the rapid progress of exhaustion. No complaint was made of abdominal pain, and on examination nothing abnormal could be detected, with the exception of some slight general tenderness on pressure. The diarrhœa appeared to increase in severity rather than to diminish. The vomiting, however, proved intractable, the pulse grew quicker and weaker, the tongue became dry and brown, sordes collected about the

teeth and lips, and the patient succumbed in four days to a progressive asthenia. The persistent vomiting and diarrhœa without collapse seemed to indicate an inflammatory affection of the gastro-intestinal tract, but the necropsy proved that death had really resulted from general purulent peritonitis, and that the rupture of a tuberculous ulcer in the vermiform appendix had allowed fæcal matter to escape into the cavity of the peritoneum.

The clinical records of the remaining cases afford but little help in formulating any rules for the diagnosis of this form of the disease. Abdominal pain may be present throughout the illness, but its onset is never sudden or accompanied by collapse, and indeed seldom exceeds that which arises from the presence of intestinal ulceration. Occasionally the abdomen may become distended and tympanitic on percussion, but in the majority of the cases these abnormal signs appear to have been absent. Vomiting is always a prominent feature, though it varies considerably in severity in different cases. Unlike the more sthenic variety of the disease, the symptom of constipation is often absent, and in not a few instances, as in the one already referred to, diarrhœa proved exceedingly troublesome. The temperature varies in different cases, sometimes showing an inclination to rise above its former point, but more often gradually declining with the approach of death. The pulse exhibits a progressive quickening with enfeeblement of its beat, the first sound of the heart soon becomes toneless or inaudible, the tongue grows dry and brown, sordes appear about the teeth, and the face acquires that peculiar drawn and sunken

expression so suggestive of acute abdominal disease.

The exact duration of life in these cases is difficult to estimate, owing to the absence of any positive data concerning the onset of the perforation; but in many instances death seems to have been delayed from five to nine days after the vomiting commenced.

With regard to that variety of "symptomless peritonitis" which has been alluded to as *latent*, the cases at disposal can only furnish 4 instances in point. In each there had been a long-continued complaint of abdominal pain and diarrhœa, and in two cases the existence of fluid in the peritoneal cavity had been diagnosed some days prior to death. The patient appeared suddenly to grow worse without any adequate cause being discovered, but after death it was found that chronic tuberculous disease of the peritoneum was associated with fæcal extravasation arising from perforation of the bowel, which from the appearance it presented was obviously a day or two old.

It is now a well recognised fact that tuberculous disease of the peritoneum renders that sensitive structure proof against many sources of irritation, which under normal conditions would excite intense inflammation. Consequently, it may be taken for granted that when once the peritoneum has fallen a victim to tuberculous disease, even fæcal extravasation will encounter some difficulty in exciting acute inflammation of its structure, while from the impaired sensibility of the serous surface the accident will fail to produce that sudden reflex inhibition of the vital organs, which is commonly termed "shock."

Although the notes of these cases are extremely scanty, it would appear that the sudden supervention of intractable vomiting and rapid asthenia in a case of tuberculous peritonitis with intestinal ulceration, the progress of which had hitherto been somewhat slow, should suggest the possibility of perforation having occurred.

The symptoms of acute peritonitis not unfrequently ensue during the course of chronic phthisis quite independent of perforation of the gut, and it is, therefore, important to recognise the various causes from which they may arise.

In the first place, local peritonitis around the intestinal ulcers may prove so severe as to closely simulate in its symptoms the more diffuse forms of inflammation; and in one case which I recently had the opportunity of watching, but little doubt was entertained that actual perforation had occurred. The patient, however, lived three weeks, and finally succumbed to the pulmonary disease; while the necropsy demonstrated the fact that the abdominal symptoms owed their origin entirely to the existence of two inflamed ulcers in the jejunum. But in such cases the onset of the pain is much less sudden than when due to perforation, collapse, with a sudden fall of temperature, is absent, and the face fails to exhibit the peculiar expression indicative of fatal mischief in the abdomen. It should also be remembered that acute perforation is of extremely rare occurrence, and that the subsequent peritonitis invariably terminates fatally within three days. Secondly, during the same period of time in which my cases of genuine perforation occurred, I find the records of

19 other cases where death had resulted from purulent peritonitis, for which neither perforation of the bowel, tuberculous disease of the serous membrane, nor renal mischief could satisfactorily account, although it is possible that in a few cases a small perforation may have given rise to the condition without its presence being detected at the necropsy. But the clinical histories of these cases make no mention of the sudden onset of pain attended by collapse, and the absence of this important diagnostic sign is almost conclusive evidence against perforation having occurred. In each instance the bases of the intestinal ulcers were much inflamed, and it is probable, therefore, that the condition of general peritonitis may have been the result of extension by continuity. Lastly, it is possible that acute tuberculous peritonitis might at an early stage be confounded with an inflammatory affection of the peritoneum arising from perforation. In this disease, however, initial collapse is entirely absent, the abdominal pain is more gradual in its onset and less severe, and fever is the rule, not the exception. Here, again, the comparative frequency of the two diseases should be borne in mind, for I find that while tuberculous peritonitis existed in nearly 4 per cent. of all the cases of phthisis which came to an autopsy, acute peritonitis resulting from perforation only occurred 15 times in 2000.

I would now draw attention to the second result of perforation of the intestine by a tuberculous ulcer—namely, the formation of a chronic abscess having a direct communication with the bowel.

Fæcal abscess may arise during the course of

chronic phthisis under two separate and distinct conditions. In one a small localised collection of pus may form in the abdominal cavity as the result of a previous attack of peritonitis, and bursting through the wall of the intestine give rise to fæcal extravasation. The second variety results directly from perforation of a tuberculous ulcer of the bowel, and it is with this condition that we are immediately concerned.

Fæcal abscess having its origin in tuberculous disease of the intestine is but rarely met with, for among 122 instances of this affection collected by Samuel Fenwick* only 10 were due to the perforation of a tuberculous ulcer. Among 2000 consecutive necropsies on phthisis performed at the Brompton Hospital I have only been able to discover 10 instances of the disease in question, and with considerable difficulty have collected 15 additional cases from various sources, making in all a total of 25. The disease occurs at all periods of life, but perhaps is most frequent between the ages of twenty and thirty. In two cases the patient was less than four years of age, and in one case over sixty. Women appear to be more often the subjects of this affection than men, for of the 25 cases no fewer than 15 were females. The sac of the abscess may be situated either within the cavity of the peritoneum, in the subperitoneal areolar tissue, or in the substance of some solid organ. In the first case its walls may be said to be formed by a thickening of the serous membrane and adhesions between the neighbouring organs; while in the second the attachment of the

* "Obscure Diseases of the Abdomen," Art. *Fæcal Abscess*. 1889. -

fasciæ and an inflammatory thickening and condensation of the connective tissue constitute an efficient barrier against further diffusion of the purulent material. The cases at my disposal afford two instances in which the abscess cavity was contained in the substance of a muscle. In one recorded by Piégu* a coil of small intestine had become adherent to the right psoas, and a perforating ulcer had given rise to a collection of pus within its tissue. In another instance an abscess in the anterior abdominal wall owed its origin to the adhesion and perforation of a tuberculous ulcer in the ileum. It is interesting to note that in many instances the walls of the sac were found profusely studded with granulations, and in not a few cases an acute tuberculous affection of the peritoneum quickly followed the establishment of the local disease. So long as the sac remains entire the orifice in the bowel continues patent and the pus is feculent; but the abscess is very apt to burrow and discharge, either externally or into some hollow viscus, and when this occurs the intestinal aperture may become completely closed, and the discharge entirely lose its fæcal character.

With regard to the location of the fæcal abscess, it is to be noticed that the large intestine is far oftener the starting point of the affection than the small, the proportion in my cases being nearly 3 to 1. In 21 instances the post-mortem notes define fairly accurately the position and relations of the abscess. In 10 it was situated in the right iliac fossa, the sac having formed eight times in the subperitoneal tissue and twice within the cavity of the peritoneum. Of

* "Bulletins de la Société Anatomique," 1837.

the subperitoneal variety 6 were due to perforation of the posterior wall of the cæcum and 2 to perforation of the vermiform appendix, which in these cases was only partially invested by the peritoneum, and lay behind the first portion of the large intestine. Both instances of intra-peritoneal abscess in this region originated in perforation of the appendix, and in one case there was a similar lesion of the ileum just above the valve. In 5 cases the abscess was found to occupy the central regions of the abdomen, in 3 of these it lay superficially and pressed the intestines backwards, while in the remaining 2 it was deeply situated among the coils of the small gut and was connected with them by numerous adhesions. The perforations in these cases were as follows:— 3 were located in the ileum, 1 in the jejunum, and in one both the duodenum and cæcum were simultaneously affected. The pelvic cavity was the seat of an abscess in 5 cases; in 3 of these a perforation was found in the small intestine, 1 in the sigmoid flexure and 1 in the upper part of the rectum. In only 2 instances was the fæcal abscess situated in the lumbar region, and in both of these the affection occurred on the right side. One originated in perforation of the ascending colon, while the other appeared to have followed fæcal extravasation from the vermiform appendix. In 12 cases the abscess burst during life, and it is important to notice that in only one instance did the sac rupture into the cavity of the peritoneum. Three times an abdominal abscess made its way through the umbilicus, feculent matter mixed with pus being discharged continuously through the wound. In 4 cases an

iliac abscess presented at the right groin, and in one the contents of the sac were evacuated by surgical interference. In 3 instances the abscess burst into some other portion of the intestinal tract; in one a lumbar abscess perforated into the ascending colon; in another an iliac abscess, resulting from disease of the appendix, made its way through the wall of the cæcum, while the third example occurred in the pelvic cavity, and the pus found its way into a loop of small intestine.

Clinical.—Attention has already been drawn to the fact that fatal peritonitis may ensue from perforation of a tuberculous ulcer in the intestine without giving rise to any symptoms indicative of the condition, and it is, therefore, not surprising to find that in the majority of cases the development of a fæcal abscess occasioned but little additional disturbance of the general health. Local pain was always complained of, and although this symptom varied in severity in different cases it was always increased by pressure and on muscular movement. Nausea and vomiting were noticeable features in nearly every case, sometimes continuing throughout the whole course of the illness, but more often only occurring from time to time. The formation of an abscess appeared to exert no influence upon the diarrhœa, which always accompanies extensive ulceration of the intestinal tract, but in one instance the stools were noticed to contain blood a few days before the discovery of the abdominal tumour. Emaciation proceeded rapidly in all the cases, and the tongue presented a dry, furred or fissured appearance. In only one case did the patient suffer from rigors, a fact worthy of par-

ticular notice, since in cases of fæcal abscess arising from causes other than tuberculous ulceration repeated shiverings are the rule and not the exception. With this single exception the clinical records of the cases fail to show that any definite degree of pyrexia accompanied the formation of the local abscess. Except when rupture of the sac took place, the abscess appears to have exerted but little influence upon the duration of life. In one case an abdominal tumour was discovered by accident a fortnight prior to death, and in the majority of cases life was certainly prolonged for three or four weeks after the presumable occurrence of perforation, death finally resulting from exhaustion. From these facts it is obvious that a fæcal abscess cannot be looked upon as a complication of chronic phthisis endowed with any symptoms more striking than those of chronic local peritonitis.

In 14 out of the 25 cases the presence of an abdominal tumour attracted notice during the life of the patient. In 9 instances the swelling occupied the right iliac fossa, in 3 the epigastric and umbilical regions, and in 2 the tumour invaded the greater portion of the anterior division of the abdominal cavity. The ease with which it could be detected varied according to the relation of the sac to the abdominal wall, the outline being irregular and ill-defined when the abscess was situated deeply among the coils of intestine, but rounded and distinct when it occupied a more superficial position in the neighbourhood of the cæcum. In a few cases the swelling was sufficiently large to produce an obvious effect upon the outline of the abdomen. Owing to the

presence of adhesions the tumour was always firmly fixed to the surrounding structures, and hence it not only resisted all attempts to displace it by lateral pressure with the fingers, but also failed to alter its position during forced acts of respiration.

Various statements are made with respect to the consistence of the tumour, some writers describing it as "hard and irregular," others as "soft and smooth," while the term "brawny swelling" is frequently made use of to express the physical characters of the disease when situated in the iliac fossa. In a few cases a certain amount of elasticity was detected in the tumour, but true fluctuation could seldom be made out satisfactorily. It occasionally happened, especially when the abscess was situated in the iliac fossa, that firm pressure over the swelling produced a gurgling noise. This sign was probably due to the sac containing a mixture of air and fluid, but in some cases it might also have arisen from the presence of a piece of intestine interposed between the anterior surface of the tumour and the hand.

The percussion note over a fæcal abscess is liable to wide variation. Sometimes the note proves quite dull, and under these circumstances the sac is presumably full of fluid. In other cases the note is found to vary according to the force of the percussion stroke, being hyper-resonant when the finger is lightly struck, but becoming dull and toneless when more forcibly percussed. Such a qualitative change in the percussion note arises in all probability from the composite nature of the contents of the abscess, the tympanitic sound being the expression of its gaseous moiety and the dull note that peculiar to the

fluid portion. There is, however, one percussion sign of such importance that, when present, it proves pathognomonic of fæcal abscess—the sudden development of tympanitic resonance over a tumour which had previously yielded only a dull note. In such a case the presence of gas within the sac can only have arisen from putrefaction among its original contents, or from the direct admission of air or intestinal gas into the cavity of the abscess. In one of my cases it was expressly noted that when the abscess due to perforation of the duodenum discharged itself through the navel, the appearance of the pus was preceded by the escape of a large quantity of very fœtid gas, after which the whole tumour became dull on percussion.

In addition to the foregoing there are one or two physical signs which are more rarely encountered. The outline of the tumour as determined by percussion is sometimes found to vary with the position of the patient, and a distinct splash becomes audible when the body is shaken or suddenly moved. In other cases, again, the physical characters of the swelling appear to be influenced to a great extent by the state of the bowels, a sudden attack of diarrhœa often giving rise to a remarkable diminution in the size of the tumour. This latter sign is almost entirely confined to those varieties of fæcal abscess which originate in causes other than tuberculous ulceration of the bowel, for in my cases diarrhœa was a constant and not an occasional symptom, and consequently a sudden diminution in the size of the sac was never observed unless rupture had taken place.

From these facts it would appear that whenever

an abdominal swelling, unattended by special symptoms, presents itself during the later stages of chronic phthisis, irregular and ill-defined in outline, immovable on deep inspiration or by pressure with the fingers, tympanitic on light and dull on deep percussion, with gurgling and pain on pressure, it will almost certainly prove to be a fæcal abscess. In some cases, however, the diagnosis can only be arrived at with difficulty, for not only may the tumour itself prove difficult to investigate on account of its deep situation, but the physical signs peculiar to the disease may be closely simulated by other pathological conditions.

It may happen that an abscess arising from perforation of the duodenum, instead of coming forwards as in the case previously alluded to, will remain localised in the immediate neighbourhood of the intestinal lesion. In this position the tumour is usually difficult to detect on account of its deep situation, and the auscultatory phenomena may so closely resemble those of pneumothorax, that Leyden has designated the condition "pyo-pneumothorax sub-phrenicus." In true pneumothorax, however, the whole of one side of the chest is expanded and motionless, while in peri-duodenal abscess the expansion of the thorax due to the tumour is strictly confined to its lower part. In the former case, again, the percussion note is hyper-resonant, the breath sounds either diminished or totally suppressed, tactile fremitus abolished, and the apex of the heart driven over to the opposite side. In the latter condition, the diaphragm is pushed upwards and the base of the lung compressed, hence where the breath

sounds are deficient the percussion note is dull and tactile fremitus increased, while the heart may be tilted upwards but its apex is never laterally displaced. Lastly, if air and fluid co-exist in the chest the splashing sounds are limited to the diseased side, but if gas and liquid are associated in an abscess cavity, the splash and metallic phenomena are distinctly audible all over the abdomen and back.

The left lobe of the liver is frequently enlarged in cases of chronic phthisis, and if previously the seat of hydatid or syphilitic disease the tumour may present some difficulty of diagnosis. From fæcal abscess, however, such a condition is easily distinguished by the absence of pain on palpation, its slow growth and definite outline, its free movement on inspiration, and by the fact that percussion produces a dull note under all circumstances.

If the tumour be situated in the right iliac fossa it may be confounded either with a cæcum thickened by tuberculous disease of its mucous membrane, or with a mass of caseous glands located behind the first portion of the large intestine. In each case a gurgle may be produced by pressure and the percussion note vary with the force of the stroke. A thickened cæcum, however, usually forms a tumour less distinct in outline than a fæcal abscess in this situation, is less painful on pressure, and exhibits little tendency to increase in size. A bundle of caseous glands may easily be recognised from the fact that the tumour it gives rise to is much harder and more irregular in outline, and less painful on pressure than a fæcal abscess, while other enlarged glands can

often be detected in the immediate vicinity or elsewhere in the abdominal cavity. It must be remembered, however, that if suppuration should occur in connexion with the tuberculous mass, the pus may eventually burst through the cæcum and give rise to a true fæcal abscess. In the cavity of the pelvis the existence of the disease can seldom be determined during life. Fæcal abscess connected with the colon may be mistaken for a tumour arising from the kidney. In the latter case the urine generally contains albumin, blood or pus, and the symptoms present point more strongly to a tuberculous affection of the kidney than to the exceedingly rare association of a local abscess with perforation of the ascending colon.

In conclusion I would briefly draw attention to a few of the less important local results of perforation of the bowel by a tuberculous ulcer.

When extensive adhesion exists between the coils of the gut, a perforating ulcer, after destroying the whole thickness of the bowel, may find itself confronted by the serous surface of another coil, and proceed to eat its way through the tissue opposed to it until it has opened up the cavity of the bowel. In this manner the intestines may be completely honeycombed and the contents of the intestinal canal no longer follow a definite route, but pass at random from one portion of the intestine to another. Thus Rindfleisch* states that these fistulous openings in the wall of the gut may exceed in diameter that of the intestine itself, and instances one case where he found five such irregular means of communication existing

* "Pathological Anatomy," vol. i., p. 449.

between different parts of the intestinal canal. In other cases fistulæ may originate by an intermediate process of abscess formation. A slight amount of leakage having taken place through the base of an ulcer, inflammation and suppuration are promptly excited in its vicinity, and the abscess thus formed by burrowing in different directions may effect a communication with another of a similar nature, or even find its way through the wall of a contiguous coil. Should any obstruction exist in the course of the intestine situated between these two points, the abscess track will be appropriated by the intestinal contents as an easier means of transit, and a permanent fistula be established. Thus in one of my cases a perforation existed in the lower end of the ileum just above an obstructed ileo-cæcal valve, and the abscess had communicated with an aperture in the vermiform appendix, and allowed the contents of the small intestine to find their way into the cæcum. In another instance an intra-peritoneal fistula was found to connect a perforation in a diverticulum from the ileum eighteen inches above the valve with the dilated cavity of the appendix cæci, and here again the valve was much obstructed. Rintel* records a case in which an abscess resulting from perforation of the duodenum had burrowed downwards and eventually established a communication with the cæcum. After death it was evident from the empty and contracted state of the jejunum and ileum that the whole of the gastric contents had been accustomed to circulate along the false canal instead of following the natural but more circuitous route. These abnormal conditions, however, seldom

* "*Berl. Klin. Woch.*," 1867, p. 332

give rise to any definite symptoms or physical signs, and are consequently of greater interest to the pathologist than to the physician.

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INDEX.

- Abdominal pain in dyspepsia, 48, 73, 110, 154
- — phthisis, 155
- Abscess, fæcal, 184
- peri-duodenal, 192
- Absorbing capacity of stomach, 127
- Acidity, 53, 54, 77, 157
- treatment of, 97
- Acids, destruction of stomach by, 37
- value of, 101
- Acute peritonitis in phthisis, 172, 176
- phthisis following corrosion of stomach, 37
- Additional bibliography, 197
- Alcohol, dislike to, 72, 116
- in treatment of vomiting, 149
- Anæmia in dyspepsia, 47, 135
- Apoplexy of pancreas, 155
- Appendix, tubercular disease of, 168
- Appetite, disorders of, 50, 70, 114, 153
- Arsenic, value of, 146
- Atonic dyspepsia preceding phthisis, 62
- Aversion to foods, 51, 71, 115
- Auto-digestion of stomach, 2
- Cancer of stomach in phthisis, 35
- Cascara sagrada, use of, 58, 96
- Catamenia, state of, 64, 120
- Catarrh, chronic gastric, 4, 18
- intestinal, 24
- subacute gastric, 53
- Climate in treatment of dyspepsia, 56, 91, 99, 137
- Cocaine, use of, in vomiting, 148
- Cod-liver oil, administration of, 143
- — value of, 59, 98, 141
- Constipation, treatment of, 52, 75, 120, 150
- Corrosion of stomach by acids, 37
- Cough, reflex, 117
- treatment of, 148
- Diarrhœa in fæcal abscess, 138
- in strumous dyspepsia, 52
- in terminal dyspepsia, 157
- Diet in antecedent dyspepsia, 91, 100
- in initial dyspepsia, 138
- in strumous dyspepsia, 57
- in terminal dyspepsia, 161
- Dilatation of stomach in dyspepsia, 124, 158
- — — phthisis, 2
- Dislike to fat and sugar, 51, 70, 115
- Duodenitis, histology of, 24
- DYSPEPSIA, THE ANTECEDENT, 60-103
- — acidity in, 77
- — acids in, 101
- — antiseptics in, 97
- — appetite in, 70
- — atonic form of, 62
- — cascara in, 96
- — climate for, 91, 99
- — cod-liver oil in, 98

Dyspepsia, the antecedent, diet in,
91, 100

- — dislikes of, 70
- — drugs in treatment of, 94, 100
- — duration of, 80
- — etiology of, 87
- — flatulence in, 73
- — frequency of, 68
- — heredity in, 68
- — illustrative cases of, 81
- — irritable form of, 65
- — maltine in, 98
- — mercury in, 101
- — opium in, 103
- — other phenomena of, 79
- — pain in, 73
- — pepsine, use of, in, 99
- — relapses in, 102
- — sedatives in, 101, 102
- — tongue in, 78
- — treatment of, 89, 99
- — vomiting in, 74

DYSPEPSIA, THE INITIAL, 104-151

- — absorbing capacity of stomach in, 127
- — acidity in, 119
- — alcohol in, 116
- — appetite in, 114, 115
- — arsenic in, 146
- — catamenia in, 120
- — climate in, 137
- — cocaine in, 148
- — cod-liver oil in, 141
- — compression of vagus in, 134
- — constipation in, 120, 150
- — diet in, 138
- — dilatation of stomach in, 124

- — etiology of, 132
- — fermentation in, 129
- — flatulence in, 119
- — frequency of, 106
- — gavage in, 141
- — hysteria in, 140
- — influence of fever on, 120
- — sex on, 108

Dyspepsia, the initial, iodine in,
149

- — iron in, 145
- — lavage in, 150
- — maltine in, 143
- — mercury in, 143
- — muscular power of stomach in, 128
- — pain in, 110
- — physical examination of stomach in, 121
- — physiology of, 124
- — progress of, 129
- — reflex cough in, 117
- — secretion of acid in, 126
- — — pepsine in, 125
- — symptoms of, 110
- — tongue in, 120
- — tonics in, 144
- — treatment of, 136
- — vomiting in, 111
- — — treatment of, 146

— STRUMOUS, 45-59

- — acidity in, 53, 54
- — anæmia in, 47
- — appetite in, 50
- — cascara in, 58
- — climate for, 56
- — cod-liver oil in, 59
- — constipation in, 52
- — diarrhœa in, 52
- — diet in, 57
- — dislike to fat in, 51
- — etiology of, 55
- — flatulence in, 53, 54
- — frequency of, 46
- — gastritis in, 53
- — influence of age and sex in, 46

- — iron in, 58
- — nausea in, 53, 54
- — pain in, 48
- — purgatives in, 58
- — thirst in, 51
- — tongue in, 53
- — treatment of, 56
- — urine in, 53

DYSPEPSIA, THE TERMINAL, 152-162

- — acidity in, 157
- — apoplexy of pancreas in, 155
- — appetite in, 153
- — diarrhœa in, 157
- — dilatation of stomach in, 158
- — epigastric pain in, 154, 155
- — etiology of, 161
- — flatulence in, 157
- — frequency of, 152
- — hæmatemesis in, 157
- — morbid dislikes in, 153
- — nausea in, 157
- — opium in, 162
- — physical examination of stomach in, 158
- — progress of, 160
- — secretion of acid in, 159
- — — pepsine in, 159
- — symptoms of, 153
- — thirst in, 153
- — treatment of, 161
- — vomiting in, 157

État mamelonné, 5, 6

Erosions, hæmorrhagic, in stomach, 7

Etiology of antecedent dyspepsia, 87

— of gastro-enteritis of phthisis, 26

— of initial dyspepsia, 132

— of strumous dyspepsia, 55

— of terminal dyspepsia, 161

Fæcal abscess, 184

— — anatomy of, 185

— — diagnosis of, 191

— — frequency of, in phthisis, 185

— — location of, 186

— — symptoms of, 188

— — termination of, 187

— — tumour in, 189

Fermentation in stomach, 129

— treatment of, 96

Flatulence, symptoms of, 78, 119, 157

Follicular ulcers in stomach, 9

Frequency of dyspepsia as a symptom of phthisis, 106

— of gastric ulcer in phthisis, 33

— of gastro-enteritis in phthisis, 15, 17

— of intestinal ulceration in phthisis, 164

— of perforation of intestine in phthisis, 168

— of tubercular disease of stomach in phthisis, 13

Gastric fermentation, products of, 129

— — treatment of, 96

Gastritis, interstitial, etiology of, 26

— — histology of, 18

— — production of, 29

— — signs of, 4

— — parenchymatous, 22

Gastro-enteritis of phthisis, 18

Gavage in treatment of dyspepsia, 141

Hæmatemesis in terminal dyspepsia, 157

— — in tubercular disease of stomach, 156

Hæmorrhagic erosions of stomach, 7

Hysterical vomiting in phthisis, 140

Intestinal catarrh, 15, 24

— fistula, 191, 195

Intestine, abscess in connection with, 184

— cirrhosis of, 25

— honey-combing of, 194

— lardaceous disease of, 25

— perforation of, 164, 168

— tubercular ulceration of, 164

Iron, use of, in dyspepsia, 58, 145

Irritable dyspepsia preceding phthisis, 65

Iodine, value of, 149

- Lardaceous disease of stomach, 6, 23, 160
 — — intestine, 25
 — — pancreas, 155
 — — ulcer of stomach, 11
 Lavage in dyspepsia, 150
- Maltine, value of, 58, 98, 143
 Mamillation of stomach, 5
 Mercury, value of, 101, 143
 Morbid states of stomach in phthisis, 1
 Muscular power of stomach, 128
- Nausea in gastritis, 54, 157
- Opium, value of, 103, 162
- Pain as a symptom of dyspepsia, 48, 73, 110, 154, 155
 Pancreas, apoplexy of, 155
 — cirrhosis of, 26
 Peritonitis, acute, in phthisis, 172, 176
 — latent, 179
 — tubercular, 182
 Pepsine, value of, 99
 Phthisis, acute peritonitis in, 172, 176, 183
 — chronic ulcer of stomach in, 10, 32
 — dilatation of stomach in, 2, 124, 158
 — dyspepsia preceding, 60
 — fæcal abscess in, 184
 — follicular ulceration in, 9
 — following corrosion of stomach, 37
 — dyspepsia as a symptom of, 106
 — gastric catarrh in, 15, 18
 — gastro-enteritis of, 15
 — hæmatemesis in, 156, 157
 — initial dyspepsia of, 104
 — lardaceous disease of intestine in, 25
- Phthisis, lardaceous disease of stomach in, 11, 23
 — morbid states of stomach in, 1
 — perforation of intestine in, 164, 168
 — — of stomach in, 163
 — relation of gastric cancer to, 35
 — — of gastric ulcer to, 36
 — — of gastritis to, 36
 — terminal dyspepsia of, 152
 — tuberculosis of intestine in, 164
 — — of stomach in, 12, 163
 — vomiting in, 111
 Physical examination of stomach, 121, 158
 Physiology of digestion in dyspepsia, 124, 158
 Purgatives, use of, 58
 Pyopneumothorax subphrenicus, 192
- Reflex cough in dyspepsia, 117
 — — treatment of, 148
 Relapsing dyspepsia, 102
 Results of perforation of intestine, 172
- Salivary glands in phthisis, 26
 Secretion of hydrochloric acid in phthisis, 126, 159
 — of pepsine in phthisis, 125, 159
 Sedatives, use of, 101, 102
 Stomach, auto-digestion of, 2
 — cancer of, in phthisis, 35
 — cirrhosis of, 18
 — corrosion of, by acids, 37
 — dilatation of, in phthisis, 2
 — follicular ulceration of, 9
 — hæmorrhage from, 156, 157
 — hæmorrhagic erosions of, 7
 — inflammation of, 18
 — lardaceous disease of, 11, 23, 159
 — mamillation of, 5
 — morbid states of, in phthisis, 1-14
 — perforation of, 163
 — physiology of, 124, 158
 — solitary glands of, 9

- Stomach, spurious villi of, 21
— tuberculosis of, 12, 163, 198
— ulceration of, 10, 32
Strumous children, dyspepsia of, 45-59
- Thirst in dyspepsia, 51, 153
Tongue, states of, 53, 78, 120, 157
Tonics, value of, 144
Treatment of antecedent dyspepsia, 22
— of initial dyspepsia, 136
— of strumous dyspepsia, 56
— of terminal dyspepsia, 161
Tuberculosis of appendix, 168
- Tuberculosis of intestine, 164
— of peritoneum, 182
— of stomach, 12, 163, 198
Tumour from fæcal abscess, 189
- Urine in dyspepsia, 53, 80
- Vomiting in antecedent dyspepsia, 74
— in fæcal abscess, 188
— in initial dyspepsia, 111, 146
— in strumous dyspepsia, 54
— in terminal dyspepsia, 157, 161

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